2-16-2023

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LIAMES, Campinas, SP, v. 23, 1-53, e023002, 2023 doi: 10.20396/liames.v23i00.8670150

Language classification in Western Amazonia: Advances in favor of the Pano-Takana hypothesis[1]

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ABSTRACT: The languages of the Pano and Takana families exhibit a considerable number of lexical and structural affinities that cannot be ascribed to mere chance and are not readily detectable instances of borrowing. After the comparative studies by Key (1968) and Girard (1971) the proposal of a genetic relationship between these two families was generally accepted (e.g., Loos 1973, 2005; Suárez 1973; Kaufman 1990; Campbell 1997). Without providing further sound evidence, however, this classification was later put into question (Fabre 1998; Loos 1999; Fleck 2013) and, even today, there is no full consensus as to whether the observed similarities are due to genetic inheritance or long-term language contact. The present paper offers lexical and grammatical evidence in support of the hypothesis that Pano and Takana are genetically connected. Comparing what can be considered Proto-Pano and Proto-Takana reconstructions, it is shown that 18 of the 40 items in the basic vocabulary list proposed by the *Automated Similarity Judgment Program* (ASJP) (Holman et al. 2008) may be cognate; this includes 9 body-part terms, which are often considered as "basic" lexicon. Also, a set of alleged grammatical cognates are assembled, and shared constructions involving motion verbal morphology, intransitive and transitive auxiliaries, transitivity harmony restrictions, and switch-reference are discussed. Interestingly, various of these shared grammatical features are cross-linguistically uncommon.
KEYWORDS: Pano-Takana; Language classification; Body-part terms; Motion suffixes; Auxiliaries; Transitivity harmony; Switch-reference

RESUMEN: Las lenguas de las familias Pano y Takana exhiben un número considerable de afinidades léxicas y estructurales que no se pueden atribuir a la mera casualidad y que no son casos de préstamo fácilmente detectables. Después de los estudios comparativos de Key (1968) y Girard (1971), la propuesta de una relación genética entre estas dos familias fue generalmente aceptada (e.g. Loos 1973, 2005; Suárez 1973; Kaufman 1990; Campbell 1997). Sin embargo, sin aportar nueva evidencia convincente, esta clasificación fue posteriormente cuestionada (Fabre 1998; Loos 1999; Fleck 2013) y, aún hoy, no existe un consenso total sobre si las similitudes observadas se deben a la herencia genética o al contacto lingüístico a largo plazo.
El presente artículo ofrece evidencia léxica y gramatical en apoyo de la hipótesis de que Pano y Takana están conectados genéticamente. Comparando por primera vez lo que puede considerarse reconstrucciones Proto-Pano y Proto-Takana, se muestra que 18 de los 40 ítems de la lista de vocabulario básico propuesta por el *Automated Similarity Judgment Program* (ASJP) (Holman et al. 2008) podrían ser cognados; esto incluye 9 términos de partes del cuerpo, que por lo general son considerados vocabulario "básico". Además, se ensambla un conjunto de supuestos cognados gramaticales y se discuten construcciones compartidas que involucran morfología verbal de movimiento, auxiliares intransitivo y transitivo, restricciones de armonía de la transitividad y cambio de referencia. Es interesante notar que varios de estos rasgos gramaticales son poco comunes en las lenguas del mundo.

[1] The present paper is a revised version of a talk delivered at the the 48th Annual Congress of the Societas Linguistica Europeae, which was held at Leiden University in September 2015 (Valenzuela & Zariquiey 2015). We thank different colleagues for valuable comments and suggestions at different points in the development of this article. We are especially grateful to Prof. Willem F. H. Adelaar, who generously supported the initial study. All remaining shortcomings are, of course, our sole responsibility.

PALABRAS-CLAVE: Pano-Takana; Clasificación lingüística; Términos de parts del cuerpo; Sufijos de movimiento; Auxiliares; Armonía de la transitividad; Cambio de referencia

1. Introduction

As noted since the late 19th Century (Armentia 1883, 1887; Brinton 1891, 1892), languages of the Pano and Takana families exhibit a considerable number of lexical and structural affinities that cannot be ascribed to mere chance and are not readily detectable instances of borrowing. Nevertheless, even today there is no absolute consensus as to whether the observed similarities are due to genetic inheritance or long-term language contact. Comparing what can be considered proto-Pano and proto-Takana, and following a strict definition of cognate (see Campbell & Mithun 1979), this paper offers lexical and grammatical evidence in support of the Pano-Takana Hypothesis; i.e., the proposal that Pano and Takana are genetically linked. This hypothesis is compatible with the claim that specific languages from these two families may have borrowed lexical and grammatical forms from each other, and from other languages in the region, both in relatively early and recent times. This is not at all surprising, considering that the Pano and Takana languages are (and were) spoken in more or less geographically contiguous areas of Western Amazonia (see Map 1).

This paper is structured as follows. Sections 2 and 3 introduce the Pano and Takana families, respectively. Attention is given to sub-classification proposals that are directly relevant to the present study. Section 4 discusses the Pano-Takana Hypothesis which, to our knowledge, was first posited by Schuller (1930). After laying out the criteria to determine proto-Pano and proto-Takana cognates, section 5 compares basic vocabulary in the two proto-languages based on the 40-items list put forward by *the Automated Similarity Judgment Program* (ASJP).[2] Complementing the lexical evidence, section 6 identifies potentially cognate grammatical morphemes and discusses constructions involving motion verbal suffixes and auxiliary verbs; some of these structures exhibit transitivity harmony restrictions in both language families. Section 6 closes with a comparison of switch-reference constructions. Lastly, the conclusions are final remarks are given in Section 7.

[2] Interestingly, Holman et al. (2008) show that these 40 concepts are the most stable among the concepts included in lexical Swadesh lists. The authors further demonstrate that increasing the dataset to 100 words does not significantly improve the results of comparative studies and thus we expect that larger comparative datasets will reveal similar results. In this line, a comparison of proto-Pano and proto-Takana that additionally takes into account the Leipzig-Jakarta Basic Vocabulary List is currently in progress (Valenzuela et al., in prep.).

Map 1. Approximate location of Pano and Takana languages

2. The Pano language family

Pano is a language family of Western Amazonia comprising some 33 (currently spoken and slumbering) languages from neighboring territories in eastern Perú (regions of Loreto, Ucayali, Huánuco, and Madre de Dios), western Brazil (states of Amazonas, Acre, and Rondônia), and northern Bolivia (departments of Beni and Pando). While the genetic relationship among some Pano languages had been noted by missionaries since the 17th Century,[3] it was de la Grasserie (1890) who first presented this proposal formally. He showed that the language spoken by an ethnic group called Pano[4] was a relative of the languages spoken by six neighboring populations (names and spellings are kept as in the original): Pano, Conibo, Pacavara, Caripuna, Culino, Maxuruna, Mayoruna Domestica, and Mayoruna Fera. He compared lexical items corresponding to body-parts, kinship relations, animals, plants, other nature elements, numerals, and a few adjectives and verbs. De la Grasserie assembled some ninety cognates, established regular phonetic correspondences, and concluded that the "languages" at hand formed an independent genetically-linked unit that he named *Pano*. According to the *Automated Similarity Judgment Program*, proto-Pano might have first split *ca.* 1,853 years ago (Holman et al. 2011).

2.1 Internal classifications of the Pano family

Different works have put forward internal classifications of the Pano family. These include Shell (1965/1975); d'Ans (1973); Loos (1999); Fleck (2013); Valenzuela & Guillaume (2017); and Zariquiey & Valenzuela (forthcoming). The proposals by Shell and Zariquiey & Valenzuela are directly relevant to the present study.[5]

[3] For instance, Iriarte considered that the language known as Pano was the "mother" of a number of Pano languages known at the time as Chipeo, Cheteo, Capanagua, Mayoruna, etc. (Chantre 1901: 93).
[4] This ethnic group and their language are now better known as Huariapano or Wariapano.
[5] For the different subclassifications of the Pano family, see Valenzuela & Guillaume (2017).

2.1.1 Shell (1965/1975)

Shell 1975 (largely based on her 1965 doctoral dissertation) is a seminal and influential work in Pano historical linguistics. The author applies the comparative method and reconstructs 512 alleged cognates by systematically contrasting data from seven Pano languages: Amawaka, Kapanawa, Kakataibo,[6] Hantxa Kuin,[7] Chakobo, Marinawa, and Shipibo-Konibo. When possible, Shell incorporates presumed reflexes in additional languages such as Atsawaka, Iskonawa, Karipuna, Kulina-Pano, and Mayoruna. Aware that her study did not include all the Pano languages known at the time, and that future works might call for modifications to her proposal, Shell names the linguistic entity she reconstructs *Reconstructed Pano*, rather than *proto-Pano*. She predicts, notwithstanding, that Reconstructed Pano and proto-Pano might not differ in significant ways (Shell 1975: 11).

Shell claims that the oldest phonological innovations separate Kakataibo from the remaining six languages. First, only Kakataibo preserved the distinction between the reflexes of *k^{w} and *k as well as alleged consonant clusters involving sibilants. Furthermore, in her analysis, Kakataibo developed the vowels /e/ and /ɔ/, as innovations. Additional support of a fairly old separation between the ancestor of Kakataibo and those of the other six languages are the use of the S case-marker -*ʂ* on pronouns (though reflexes of this marker are also found in Amawaka and, to a limited extent, in Iskonawa) and the absence of -*a* on the 1st and 2nd person singular pronouns in object function (a feature shared by Hantxa Kuin). Finally, some Kakataibo lexical items have a clearly different origin than their equivalents in the examined sister languages (Shell 1975: 106-108).[8]

Changes involving the reflexes of *ß and *w are attested in Hantxa Kuin, Marinawa, and Amawaka (see the Headwaters subgroup in Table 1 below). The meaning of certain words also brings these three languages together, but additional phonological and lexical data suggest a closer relationship between Hantxa Kuin and Marinawa to the exclusion of Amawaka. Subsequently, Chakobo separated from Shipibo-Konibo and Kapanawa, at which point the loss of the last syllable of trisyllabic items extended to all other languages. In addition, there are several lexemes that are only shared by Shipibo-Konibo and Kapanawa (Shell 1975: 109-110).

Although her work does not include a complete set of Mayoruna data, Shell observes that this language (known as Matses in Peru) has various lexical items that lack cognates in the sister languages. The author concludes that Mayoruna borrowed a sizeable amount of vocabulary from non-Pano languages (p. 110).[9] There are also a few terms exclusively found in Matses and Kakataibo; these were interpreted as retentions of older forms (*Shell 1975:* 110). Figure 1 reproduces Shell's "speculative genealogical tree".

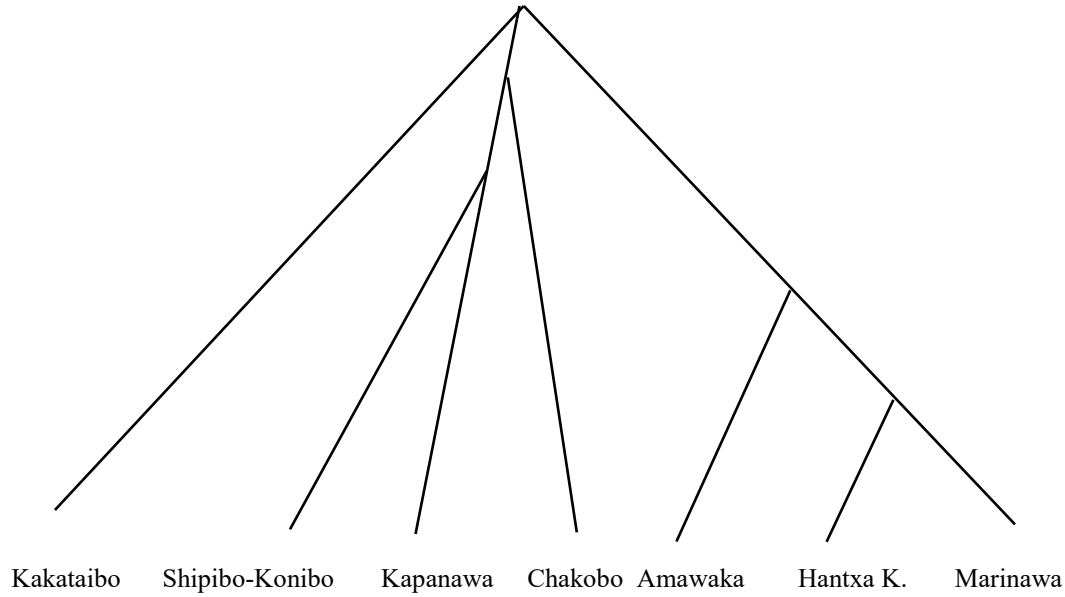
[6] Shell employs the glossonym *Kashibo* 'The Bats'. We avoid this term here, since it is considered pejorative by native speakers. Instead, they call their language *Kakataibo*, which is also the name of one of the dialects. We substitute the term *Kashibo* with *Kakataibo* throughout this article.

[7] Shell employs the glossonym *Kashinawa* 'Bat People'. We avoid this term here, since it is considered pejorative by native speakers. Instead, some of them call their language *Hantxa Kuin* 'Core language'.

[8] Among the phonological changes that do not consistently distinguish Kakataibo from its sister languages in the study are those involving *ʔ. Thus, in word initial position, the reflex of *ʔ is attested in Shipibo-Konibo, Kapanawa, Kakataibo, Amawaka, and Chakobo, but not in Hantxa Kuin or Marinawa. In intervocalic position within the word, the reflexes of *ʔ are found in Kapanawa, Amawaka, and Chakobo, but not in Shipibo-Konibo, Kakataibo, Hantxa Kuin, or Marinawa. Within the word, between a vowel and a consonant, *ʔ might have only been kept in Kapanawa (Shell 1975: 57, Valenzuela & Guillaume 2017: 12).

[9] Regarding the differences between Matses (Mayoruna) and other Pano languages, Aikhenvald (2006: 38) refers to the probable linguistic influence exerted by women speaking other Pano and non-Pano languages who, after having been captured during raids to neighboring villages, were incorporated into Matses society. The Matses variety these women spoke to their children may reflect incomplete second language acquisition and substrata from their native languages. An additional factor to consider is the taboo practice whereby nouns associated to the names of deceased people are avoided and replaced in everyday speech (Fleck 2013: 45).

Figure 1. Tentative Genealogical Tree of the Pano Family (Shell 1975: 109)



Shell (1975: 11) observes that although Pano languages share a large number of cognate lexical roots, suffixes differ greatly in form and use. Interestingly, a similar remark regarding Takana languages is made by Girard (1971) (section 3).

The main gap in Shell's study might be the absence of the Northern Pano languages from her systematic comparison (Valenzuela 2003: 54-55) (albeit a significant amount of Mayoruna vocabulary is provided in the footnotes). This omission is understandable given the scarcity of available data in the 1960s. An independent Northern Pano branch was proposed decades later by Erikson (1992), who named it "Mayoruna".[10] This author mentions reports from individuals pertaining to different Northern Pano ethnic units claiming mutual intelligibility among them. Accordingly, it has been later stated that the Northern languages are more similar to each other than to sister languages from any other Pano subdivision in terms of the lexicon (Fleck 2003: 10-11 and 2010: 33). Further similarities concern phonemic inventories, valence adjusting suffixes, ergative case-marking, and nominative person agreement on verbs (Fleck 2003: 10-11, 2010: 33 and elsewhere). Another important absence in Shell's work concerns Kasharari, a Southeastern Pano language that may constitute a major branch by itself.

2.1.2 Zariquiey & Valenzuela (forthcoming)

Zariquiey & Valenzuela's (forthcoming) sub-classification of currently spoken Pano languages is mainly based on a systematic phylogenetic comparison which took as a starting point a 200-word Swadesh list and ended up with an inventory of 1011 Pano lexical forms whose presence/absence was annotated for the following 20 languages (unless otherwise indicated the data derive from the authors' own fieldwork): Amawaka, Chaninawa, Chakobo (Zingg 1998), Hantxa Kuin, Iskonawa, Kakataibo, Kapanawa (Loos & Loos 1998/2003), Kasharari (Lanes 2000; Sousa 2004), Katukina (Lanes 2000; Key 2000), Marinawa, Marubo

[10] Erikson (1992) relies mainly on ethnological evidence. However, based on her analysis of the Mayoruna data in Kneeland (1979), Valenzuela (2003) estimates that Erikson's proposal has linguistic support and includes Mayoruna in her comparative chapter on "Participant Agreement" (Valenzuela 2003: chapter 20).

(Fields 1970; Souza 1979), Mastanawa, Matis (Souza 1979; Spanghero 2005), Matses (Fleck et al. 2012), Nawa, Poyanawa (Carvalho 1931; Paula 1992), Sharanawa, Shipibo-Konibo, and Yaminawa.

According to Zariquiey & Valenzuela's proposal, the Pano family may be divided into three first-order branches: Northern, Central-Southern, and Southeastern.[11] The Northern Branch includes four languages: Matses, Kulina, Korubo, and Matis; only two were included in the sample due to lack of data. The Central-Southern Branch subdivides into five categories: Ucayali, Headwaters (A, B, C, and D), Southern, Marubo-Katukina, and Preandine/Western. Crucially, the Southeastern Branch is composed of a single language, Kasharari. Interestingly, Kasharari and Chakobo seem to be the only Pano languages exhibiting overt case-marking of the recipient argument in ditransitive constructions: *=ki* in both instances (Valenzuela & Oliveira 2012). This similarity may be due to language contact. A retention shared by Kasharari and Chakobo is the maintenance of the last syllable in the citation form of trisyllabic nouns, which became lost or remains latent in most sister languages (Valenzuela 2003: 53).[12] Zariquiey & Valenzuela's classification is presented in Table 1.

Table 1. Internal classification of currently spoken Pano languages based on phylogenetic comparison (Zariquiey & Valenzuela, forthcoming)

I. NORTHERN BRANCH

Matses
Kulina
Korubo
Matis

II. CENTRAL-SOUTHERN BRANCH

Subgroup 1: Ucayali[13]

Shipibo-Konibo
Kapanawa

Subgroup 2: Headwaters

A. Hantxa Kuin

B. Yaminawa
Yawanawa
Arara
Nawa
Mastanawa
Sharanawa
Chaninawa
Marinawa

C. Amawaka

[11] The authors follow the geographically-based labels in Valenzuela & Guillaume (2017) and Oliveira (2014), which in turn derive from d'Ans (1973) and Valenzuela (2003).

[12] Additionally, Chakobo and Kasharari appear to be the only Pano languages using the term *chaxpa ~ chaxpá* for 'dog'. A very similar lexical item is present in Cavineña (Takana). Muniche, an unclassified language from northeastern Peru, features the noun /tʃaçpu/ 'body hair, feathers, skin (with the hair)' (Gibson 1996: 84). Also, note that Chakobo and Kasharari lost the final nasal in the reflex of *=ʂo=n (§6.4).

[13] The Pano language Saynawa (described in Couto 2010) may belong to this subgroup, though it also presents similarities with the languages in Subgroup 2, B.

D. Iskonawa
Poyanawa
Nukini

Subgroup 3: Southern
Chakobo/Pakawara

Subgroup 4: Marubo-Katukina
Marubo
Katukina

Subgroup 5: Preandine/Western
Kakataibo

III. SOUTHEASTERN BRANCH

Kasharari

Zariquiey & Valenzuela's (forthcoming) proposal is compatible with most of the claims found in some certain previous classifications, particularly Fleck (2013) and Valenzuela & Guillaume (2017).[14] Furthermore, the authors do not discard the possibility that Kakataibo may constitute an independent Preandine/Western Branch, a fact that might have been obscured by the numerous lexical items this language has borrowed from its more dominant neighbor Shipibo-Konibo (Shell 1975: 110; Wistrand-Robinson 1998: 115-116). Therefore, Zariquiey & Valenzuela do not discard the possible existence of four first-level branches, as provisionally and cautiously put forward by Valenzuela & Guillaume (2017): Northern, Western/Preandine (Kakataibo), Southeastern (Kasharari), and Central-Southern (all remaining languages). We return to this in §5.1.

3. The Takana family

The Takana family is presently composed of five languages: Tacana, Reyesano or Maropa, Araona, Cavineña, and Ese' Ejja; all of them are spoken in northern Bolivia (departments of La Paz and Beni), with Ese' Ejja extending northward into the Madre de Dios region of Peru. Applying the *Automated Similarity Judgment Program*, it has been estimated that proto-Takana may have first split *ca.* 1,590 years ago (Holman et al. 2011). Based on the scanty lexical data available at the time, Brinton (1901[1891], 1892) was the first scholar to propose a Takana "stock", comprising fourteen "tribes" in 1891 and nineteen in 1892[15] (Girard 1971: 2, 11; Valenzuela & Guillaume 2017: 19-20).

Decades later, in a "lengthy and rather haphazard study" (Girard 1971: 11), Créqui-Montfort & Rivet (1921-23) assembled additional linguistic data, eliminated some of the

[14] Fleck (2013) divides the Pano family into two main branches: Mayoruna (i.e., Valenzuela & Guillaume's (2017) Northern Branch) vs. Mainline (all other languages). Zariquiey & Valenzuela (forthcoming) treat Shipibo-Konibo and Kapanawa as distinct languages given their significant phonological and grammatical differences (see also Valenzuela & Guillaume 2017), and assign Iskonawa (and the closely related Poyanawa and Nukini) to the Headwaters subgroup (see d'Ans 1973; Zariquiey, Vásquez & Tello 2017). Also, Zariquiey & Valenzuela (forthcoming) join Valenzuela & Guillaume (2017) on the need to completely discard the term *Chama* from Pano studies, since it is considered extremely offensive by the Shipibo-Konibo (Shell 1975: 27; Eakin; Lauriault & Boonstra 1980: 4; Morin 1998: 288, 417, note 6; Valenzuela & Valera 2005: 182-183). This unfortunate label is used by Fleck (2013) to name the subgroup to which Shipibo-Konibo belongs. Instead, Zariquiey & Valenzuela (forthcoming) refer to this entity as *Ucayali Pano*, following d'Ans (1973), Valenzuela (2003), Oliveira (2014), and Valenzuela & Guillaume (2017).

[15] Brinton's classification included names of geographical locations, clans, linguistic entities that do not belong to Takana, alleged languages for which there were not supporting evidence, etc. (Girard 1971: 2).

questionable "languages" in Brinton's classification, and identified a number of shared morphological traits. Under their Takana language family these authors grouped thirty-seven "tribes", which were then organized into nine "dialects" using linguistic and geographical criteria (Valenzuela & Guillaume 2017: 20). Créqui-Montfort & Rivet further compared their Takana data with Quechua-Aymara, Pano, and Arawak. Surprisingly, the authors concluded that Takana was part of the Arawak family, although its grammar had been secondarily modified by Pano languages (1922:147; section 4).[16]

Schuller (1933) reanalyzed the data in Créqui-Montfort & Rivet (1921-23)[17] and presented a synthesis of phonological, grammatical, and lexical features found in the different Takana "dialects". He included data from Araona, Cavineña, Guariza, Maropa (also known as Reyesano), Sapibocona, and Tacana[18] (Valenzuela & Guillaume 2017: 20). As discussed in §4 below, Schuller is the first scholar to argue for a genetic link between Takana and Pano. In the second half of the 20th century, Key (1968) and Girard (1971) applied the comparative method and attained a reconstruction of proto-Takana phonology comprising over 500 cognate sets. Girard notes that, while sound change has been conservative in Takana, morphological change, particularly regarding suffixes ("root extensions") has been radical.[19] This remark mirrors the one made by Shell (1975) concerning the development of Pano languages (§2.2.2). Key and Girard compared their proto-Takana reconstructions with Pano languages and Reconstructed Pano, respectively. Table 2 offers Girard's (1971) classification of the five Takana languages spoken today.

Table 2. Classification of currently spoken Takana languages (Girard 1971)

I. TAKANIK BRANCH: Tacana, Reyesano/Maropa, Araona

II. KAVINIK BRANCH: Cavineña

III. CHAMIK BRANCH: Ese' Ejja

The main criteria to classify Tacana, Reyesano, and Araona under the Takanik Branch seems to be the phonological change *j > t͡ʃ.[20] In addition, these languages share some lexical roots that are purportedly absent in the other languages: *zawi 'chin', *ta 'leg',[21] *kana 'food', *piba 'think', *pu 'do', *tipi 'neck', and *na 'water' (Girard 1971: 43-44, Valenzuela & Guillaume 2017: 22). Kavinik has unique reflexes of *k and *r. Reflexes of *t͡ʂ and *r show a closer

[16] Contemporary scholars like Schmidt (1926), Krickeberg (1922), and Grubb (1927) treated Takana as an independent, unclassified linguistic entity (Girard 1971: 13). Later, Loukotka (1935) and Rivet & Loukotka (1952) maintained the Arawak origin of the Takana family, while Mason (1950) included Takana under his "languages of probable Arawakan affinities" (Girard 1971: 14, Valenzuela & Guillaume 2017: 25). Finally, McQuown (1955) considered Takana as an independent family, a view this time shared by Loukotka (1968).

[17] Schuller did not cite Créqui-Montfort & Rivet (1921-23). This may be related to the fact that his work was published posthumously (Valenzuela & Guillaume 2017: 20).

[18] In this work, "Tacana" and "Takana" refer to the language and the language family respectively.

[19] Girard (1971: 4) claims the following: "… sound change has been conservative in Takana, but morphological change (particularly in regard to suffixes or general "root extensions"…) has been relatively radical. Suffixes which may be productive and meaningful in one language and therefore readily segmentable, may in another language be nonproductive and segmentation, as far as semantics is concerned, difficult or impossible to effect with certainty. In a third language, these suffixes may well not exist at all, may be replaced by other suffixes, or may be used in morphological constructions quite different from those of the other daughter languages".

[20] Girard (1971) uses his own phonetic representation, which largely follows the so-called Americanist Phonetic Notation (APA) with a few idiosyncrasies. In this paper, we have adapted Girard'a annotations according to the the International Phonetic Alfabet.

[21] Nonetheless, Girard (1971: 44) calls attention to the existence of *awa-**taka*** 'tapir-foot' (tree name) in Cavineña, albeit *taka* is not the term for this body-part at present. Interestingly, this language also presents the transitive verb *tapa-* 'step on sth., kick, exert pressure with the foot' (Camp & Liccardi 1989: 222).

affinity to Takanik, but reflexes of *j and *s appear closer to Chamik (Girard 1971: 45). Chamik has unique reflexes of *t͡ʂ and *r, but shares reflexes of *k and *r with Takanik and reflexes of *j and *s with Kavinik. Ese' Ejja (the single Takana language spoken in Peru) has more non-cognate material than all the remaining languages (*ibid.*: 46-47).[22]

4. The Pano-Takana hypothesis

Lexical and grammatical resemblances between Pano and Takana languages that cannot be ascribed to mere chance were noted by scientists, missionaries, and travelers since the late 19th Century (e.g., Armentia 1883, 1887; Brinton 1891, 1892). The observed similarities were, nonetheless, interpreted as probable instances of borrowing. Créqui-Montfort & Rivet (1921-23) compared their Takana material with Quechua-Aymara, Arawak, and Pano (Maxoruna, Kulino, Pano, Sipibo, Arasaire, Yamiaka, Atsahuaka, Pakaguara, and Chakobo). They unveiled a number of structural affinities and even identities between Takana and Pano, stating that "their general structure is the same, they employ the same processes, and finally their pronominal series are in no way different" (1921: 301, our translation).[23] Nevertheless, the authors adduced that the lexical similarities were relatively insignificant (1922: 143), and most of them appeared to be loans either between Pano and Takana, or from Arawak into Takana and/or Pano. In contrast, they argued that the lexical resemblances between Takana and Arawak were not only more numerous than those shared by Takana and Pano, but the given items belonged to the realm of the more essential vocabulary and thus might not have been borrowed. Consequently, Créqui-Montfort & Rivet concluded that Takana was a member of the Arawak family, although its grammar had been influenced by Pano languages (1922: 146-147, Girard 1971: 11, Valenzuela & Guillaume 2017: 24).

Loukotka (1968) treats Takana as an independent stock, thus departing from his prior works in which he had ascribed it to Arawak (Loukotka 1935; Rivet & Loukotka 1952). Loukotka's failure to link Pano and Takana might be due to the paucity of data available to him; namely, 12 lexical items for Pano languages and 11 for Takana languages, with only 8 items shared by both lists (*head, water, sun, house, tapir, maize, one, two*). Of these 8 common items, 3 show resemblances (*tapir, maize, two*); actually, this is a relatively high percentage. Loukotka lacked the necessary data to note the similarity between the Pano form for 'sun' and the Takana form for 'moon' (Table 5).

Revisiting the materials in Créqui-Montfort & Rivet (1921-1923); Schuller (1933) confirms the unity of the Takana family but arrives at a different conclusion regarding its relationship with Pano. In this way, Schuller becomes the first scholar to propose a genetic connection between these two language families (Girard 1971: 13, 145).

> …I have shown that the Tacana, Cavineña, Araona, Toromona, Maropa, Sapibocona and Guariza are closely related dialects. And …by careful inquiry and comparison of what was accessible at the present time, I have obtained data which confirm relationship between the Tacana dialects and the Pano linguistic family. (Schuller 1933: 480)

The evidence provided by Schuller was meager, inconsistent, and taken from older sources with deficient transcriptions (Girard 1971: 13, 145). The author further suggested that Pano-

[22] A rough estimate would place Tacana well over 50 percent [of cognate material], Cavineña somewhat under 50 percent, and Ese' Ejja at about 30 percent (Girard 1971).

[23] "Leur structure générale est la même; elles emploient les mêmes procédés; enfin, leurs séries pronominales ne diffèrent en rien" (Créqui-Montfort & Rivet 1921: 301).

Takana was part of a "Carib-Aruác stock".[24] Despite these flaws, Schuller drew attention to intriguing structural affinities between Pano and Takana that had been dismissed as mere borrowings by Créqui-Montfort & Rivet (1921-23). Consider the following personal and demonstrative pronouns from a Takana and a Pano language noted by Schuller (1933: 480; orthography as in the original):[25]

(1)

	Tacana (Takana)	Sipibo (Pano)
'I'	*ea-ma*	*ea*
'thou'	*mia-ẑa*	*mi, mia*
'he, his'	*uxa, A.*[26]	*hua*
'you [pl.]'	*mi-cuana*	*mi-bu*
'that one'	*tue-ẑa*	*tua*

Decades later, Girard (1971) posits the following proto-Pano-Takana reconstructions associated to the above forms given by Schuller (see also 6.1).

(2) **ʔɨ: pP (proto-Pano) *ʔɨ 'I', pT (proto-Takana) *ei- 'I' (p. 161, set 11)
**ha-: pP *aa '3rd p. pronoun', pT *a- 'stem of interrogative pronouns'
(cf. proto-Pano *awɨ/a 'what?') (p. 164, set 45)
**mi: pP *mi 'thou'; pT *mi 'thou' (p. 167, set 72)
**tu-: pP *tu- 'there, that'; pT *tu- 'general 3rd person' (p. 170, set 110).

To Girard's reconstructions above, one might add **u- based on the proto-Pano distal demonstrative *ʔo- and proto-Takana *u- 'this, he' (see Table 7). Additional similar morphemes noted by Schuller (1933: 480) are the negative, causative, and imperative.

(3)

	Takana	Pano
Negative	*-ma* (Cavineña)	*-ma* (Shipibo-Konibo)
Causative	*-me* (Tacana)	*-ma* (Shipibo-Konibo)
Imperative	*-que* ~ *-cue* (Tacana)	*-hue* (Shipibo-Konibo)

David Payne (1990) identified a number of grammatical forms that are attested in several genetically-unrelated South American languages. Among these widely shared forms are the Pano and Takana negative and causative morphemes which, hence, cannot unproblematically be taken as Pano-Takana cognates. For the imperative, nonetheless, Girard posits **g^{w}ɨ based on Reconstructed-Pano *-wɨ and proto-Takana *-k^{w}e (Table 7).

In her 'Comparative Takana Phonology', Key (1968) includes Pano "cognates or presumed cognates" (p. 52) but does not attempt a reconstruction of proto-Pano-Takana. Shortly afterwards, Girard (1971) reconstructs 116 proto-Pano-Takana lexical and grammatical items with recurrent phonetic correspondences.

[24] "Since the publication of my study entitled "Las Lenguas Indígenas de la Cuenca del Amazonas y del Orinoco", Rio de Janeiro, 1910, I insisted again and again that the Pano are linguistically related to the Carib-Aruác. The former may also represent mixed idioms" (Schuller 1933: 481, note 157).
[25] Schuller includes Mosetén in this comparison. The Mosetén data are: 'I' *ye,* 'thou' *mi,* 'he, his' not available, 'you [pl.]' *mi-in,* 'that one' *uts.*
[26] This abbreviation stands for Araona.

To this day, there is no absolute consensus regarding the type of relationship between Pano and Takana. Valenzuela & Guillaume (2017: 28-29) provide a list of scholars who have favored or accepted[27] the Pano-Takana Hypothesis, or rather expressed reservations about its validity. The few authors who have favored the language contact hypothesis to the exclusion of genetic inheritance do not necessarily coincide in their type of objections. For instance, recall that Créqui-Montfort & Rivet (1921-23: 301) asserted that Pano and Takana show numerous grammatical affinities (and even parallelisms and identities), but very few shared lexical items. In contrast, several decades later Fabre (2005) states that while the lexical correspondences are numerous, morphological correspondences are scarce.[28]

> Almost all modern classifications coincide in bringing together the two groups of languages, Pano and Takana, under the same stock, but one should not discard the possibility that the lexical correspondences, which are very numerous, between these two families be due to an old areal contact, as apparently denounced by the morphological correspondences, much weaker than the lexical ones, and that could be best explained by areal contact rather than genetic affiliation. (Fabre 2005, our translation)

There are two other types of objections to the Pano-Takana Hypothesis. The first one stems from a misinterpretation of Girard's (1971: 145) remark regarding the contrast between relatively minimal sound change in the lexical roots but radical morphological change in the "root extensions" or suffixes between Pano and Takana. Fleck (2013: 22), who expresses skepticism with respect to the Pano-Takana Hypothesis, cites the following statement by Girard (1971): "Unless one can extract roots, one is left with a meager corpus of allegedly cognate material –so meager indeed that the evidence for a Pano-Takana relationship seems only probable". Taken out of context, this excerpt gives the impression that Girard is specifically questioning the Pano-Takana relationship, which is not the case. In fact, when examining Girard's statement in context it becomes obvious that his observation is not limited to Pano-Takana. The citation below contains the excerpt provided by Fleck (2013) embedded in its context:

> While many presumably cognate lexical items show minimal sound change, the vast majority of them show radical morphological changes. The same problem, within the Takana family, is simply magnified when one attempts to correlate the two families. **Unless one can extract roots, one is left with a meager corpus of allegedly cognate material –so meager indeed that the evidence for a Pano-Takana relationship seems only probable.** (Girard 1971:145, bold case added by the authors)

Thus, the seeming paradox observed by Girard does not only apply to the Pano-Takana level, but also to the Takana family itself. Therefore, it is to be expected that the puzzling situation independently found within Pano (see §2.2.2) and within Takana (see §3) will be "magnified" when comparing the two language families with each other. Girard cautiously stated that there were not enough linguistic data available at the time to definitively prove genetic affinity between Pano and Takana (1971: 145); despite this, he judged this hypothesis probable.

The second type of objection to the Pano-Takana Hypothesis concerns the fact that neither Key (1968) nor Girard (1971) compared their proto-Takana reconstruction with proto-Pano (Fleck 2013: 22). This is certainly a valid criticism. Key's (1968) study, a published

[27] Although Girard (1971) is listed within the latter group, this author actually sustains that Pano and Takana are probably genetically related. Indeed, as mentioned earlier, he even reconstructs 116 proto-Pano-Takana forms.

[28] The original reads: "Casi todas las clasificaciones modernas coinciden en reunir los dos grupos de lenguas pano y takana bajo el mismo tronco, pero no hay que descartar la posibilidad de que las correspondencias léxicas, bastante numerosas, entre estas dos familias se deban a un contacto areal antiguo, lo que parecen denunciar las correspondencias morfológicas, mucho más tenues que las léxicas, y que mejor podrían explicarse por contacto areal que por filiación genética".

version of her (1963) dissertation, resorts to data from five individual Pano languages: Amawaka, Kakataibo, Chakobo, Chaninawa, and Marinawa.[29] Girard (1971), on the other hand, relied on Shell's Reconstructed Pano, which should not be taken for the protolanguage (see §2.2.2). Nowadays we have at our disposal substantial descriptions of a few Pano and Takana languages carried out in the last couple of decades (see Fleck 2013; Valenzuela & Guillaume 2017). Moreover, Oliveira (2014) has reviewed and complemented Shell's (1965/1975) study by comparing 19 Pano languages, including Kasharari (Southeastern Branch) and three languages of the Northern Branch: Matis, Korubo, and Matses (though data from all the languages are not available for each compared item). Therefore, Oliveira's reconstruction can be considered fairly close to proto-Pano.

Adelaar with Muysken (2004: 419) affirm that the phonological evidence provided by Key (1968) and Girard (1971) in support of a genetic link between Pano and Takana is convincing. At the same time, they advert to the possibility of an "early contact phase:"

> Girard (1971: 4, 145) stresses the puzzling fact that phonological changes in lexical roots have been limited within both the Pano and Tacanan branches, but that morphological changes, particularly in the 'root extensions', have been radical. This pattern points to an interesting early contact phase in language groups. (Adelaar with Muysken 2004: 419)

We interpret Adelaar with Muysken's (2004) conclusion as supporting the Pano-Takana Hypothesis and, simultaneously, raising the possibility of early language contact between languages of these two families. Although the authors do not elaborate on the latter scenario, it probably implies that after the initial split between Pano and Takana, specific languages from the two groups entered into contact which resulted in an increase of lexical similarities between them. This claim, however, requires further research.

5. Lexical evidence in support of the Pano-Takana hypothesis

Comparison of basic vocabulary has traditionally played and continues to play the main role in linguistic genetic classification proposals (Hammarström 2014; Muysken & O'Connor 2014). But before we embark on this task, addressing the criteria employed to determine potential cognates is in order.

5.1 Criteria to determine potential cognates

In this study we adhere to strict standards in positing probable proto-Pano-Takana forms and, therefore, our results can be said to be fairly conservative. Following Campbell & Mithun (1979), we attempt to avoid possible lexical coincidences by looking at potential cognates larger than CVC. This, of course, was more difficult to apply on grammatical forms, which are often shorter than CVC (Campbell & Mithun, *op. cit.*); crucially, this includes bound roots referring to body-parts in Pano and Takana. Given that certain lexical items with concrete references (such as cultural tools or specific flora and fauna) are easily borrowed among languages, we based the present study on the 40 basic vocabulary items in the ASJP list (Holman et al. 2008)[30] as well as on body-part terminology more generally. Neither onomatopoeias nor words for mother/father are included as lexical evidence of genetic relation between the two language families.

[29] Marinawa and Chaninawa are now considered dialects of the same language.

[30] Although the ASJP method is not exempt from criticisms, it is clear that the 40 items in their list can be considered part of the basic vocabulary.

For proto-Takana, we depart from the reconstructions in Girard (1971) and expand them with data from grammatical descriptions and dictionaries.[31] Girard explains that for a cognate term to be included in his proto-Takana dictionary it must appear in at least two of the three subdivisions of the family (i.e., Takanik, Kavinik, Chamik; see Table 2). However, in exceptional instances he includes terms only attested in Takanik, the most diversified and large branch of the family (Girard 1971: 49). In the present study, only items found in Takanik and at least one additional branch are taken into consideration.

Recent internal classifications of the Pano family differ with respect to what might constitute the first-level branches of this linguistic entity. According to Fleck (2013), there are only two main branches that separate the Northern languages from all other sister tongues (§2.2.4). On the other end, Valenzuela & Guillaume (2017) provisionally distinguish four first-level divisions within Pano: Northern, Central-Southern, Western or Preandine (composed only of Kakataibo), and Southeastern (composed only of Kasharari). Finally, Zariquiey & Valenzuela (forthcoming) propose three main branches: Northern, Central-Southern (which includes Kakataibo), and Southeastern (only Kasharari) (§2.2.5). In this study we adopt a cautious approach so that to be considered part of proto-Pano a lexical or grammatical item must be present in the Central-Southern Branch, the Northern Branch, and Kakataibo and/or Kasharari. Clearly, to be considered cognate the alleged proto-Pano and proto-Takana forms must show regular correspondences with respect to (almost) all of their sounds, and their semantics must be evidently close. In sum, we claim that our reconstructions adhere to the comparative method: we observe a strict definition of cognate, compare language states that may be considered proto-Pano and proto-Takana, and seek for systematic sound correspondences in semantically close words. Although it is expected that further comparative work will yield additional cognate sets and require certain modifications of our proposal, we are confident that the main conclusions of the present study will stand.

For sound correspondences between proto-Pano and proto-Takana we largely rely on Girard's (1971: 155) proto-Pano-Takana reflexes. Table 3 (adapted from Valenzuela & Guillaume 2017: 26) lists the sound correspondences that are attested in the data this paper is based on. The list presented in Table 3 comes from Girard (1971), with one exception: we put forward the following sound correspondence: proto-Pano-Takana **ṽ/ʌn: *proto-Pano ṽ, proto-Takana: *ʌ[32]. Proto-Pano-Takana reconstructed sounds are preceded by double asterix **, while their proto-Pano and proto-Takana reflexes are preceded by a single asterix *. (The same conventions apply to morpheme reconstructions in §6).

Table 3. Proto-Pano-Takana Reflexes (adapted from Girard 1971: 155, using plausible IPA symbols, the following correspondence was added by the authors proto-Pano-Takana **ṽ/ʌn: *proto-Pano ṽ, proto-Takana: *ʌ)

proto-Pano-Takana	proto-Takana	proto-Pano
**p	*p	*p
**t	*t	*t
**t͡s	*t	*t͡s
**kʷ	*kʷ	*kʷ
**ʔ	*Ø ~ ʔ	*ʔ

[31] For example, we provide additional data and/or (different) reconstructions for the ergative, detransitivizer/reflexive, desiderative, *-be 'do coming' (see Table 7 and referenced notes).
[32] This applies to 'knee', 'fingernail', and 'elbow' in tables 5 and 6, as well as the genitive in Table 7.

**b	*b	*β
**d	*d	*ɾ
**g^w	*k^w	*w
**ʂ	*t͡ʂ	*ʂ
**z	*j	*s ~ t
**h	*Ø	*Ø ~ h
**m	*m	*m
**n	*n	*n
**N[33]	*ɾ	*n
**e	*a	*i
**a	*a	*a
Ṽ ~ Vn	V	Ṽ (not in Girard 1971)

Table 4 presents some instances of the sound correspondences that are particularly recurrent in the lexical and grammatical cognates to be given later.

Table 4. Illustration of certain proto-Pano-Takana reflexes (pPT = protoPano-Takana, pT = protoTakana, pP = protoPano)

pPT	pT	pP		pT	pP
**d	*d	*ɾ	'howler monkey'	***d**uʔu	***ɾ**oʔo
**g^w	*k^w	*w	'mother'	*e-**k^w**a	***ɨw**a
**s̬	*t̬s	*ʂ	'fat'	***t͡ʂ**eri	***ʂɨ**ni
**N	*ɾ	*n	'big'	*aɾi	*a**n**i
**ɨ	*e	*ɨ	'flute'	*d**e**w**e**	***ɾɨ**w**ɨ**
**e	*a	*i	'hole'	*k**a**ni	*k**i**ni
**u	*u	*o	'howler monkey'	*d**u**ʔ**u**	***ɾo**ʔ**o**[34]

5.2 Lexical evidence

Our search for lexical evidence in support of the Pano-Takana Hypothesis began with a comparison of the 40 items in the list put forward by the *Automated Similarity Judgement Program*. It has been determined that the ASJP list, which consists of the most stable meanings in the 100-item Swadesh list, yields classificatory results that are at least as accurate as those produced by using the full Swadesh list (Holman et al. 2008).[35] As can be observed in Table 5 below, 18 of the 40 lexical items in the ASJP list exhibit semantic and formal identity or strong similarity between proto-Pano and proto-Takana, and meet the regular sound correspondences in Table 3. This is certainly a high degree of similarity.[36]

[33] Alveolar Nasal Archiphoneme

[34] Shell (1975) reconstructs a single back vowel, *o. However, recent phonological analyses of daughter languages seem to favor a higher back vowel instead.

[35] As indicated in footnote 2, further lexical comparison between proto-Pano and proto-Takana is underway.

[36] Payne (1989) suggests that a percentage of 3%-13% of CVC cognates in a 100-item basic vocabulary list, like the Swadesh list, is evidence of a deep genetic relationship.

For ease of comparison the proto-Pano forms are numbered according to Shell (1975),[37] while the proto-Takana and proto-Pano-Takana ones follow the numbering in Girard (1971). New reconstructions or reconstructions that differ significantly from prior proposals remain unnumbered (pPT 'leaf', pP 'hand', pT 'fire', pPT 'breast', pT 'come').

Table 5. Proto-Pano-Takana Probable Cognates Based on ASJP List[38]

#	gloss	proto-Pano	proto-Takana	proto-Pano-Takana	sound correspondences[39]
1	Tree	147. *hiwi[40]	8. *ak^{w}i	47. **heg^{w}i	h = ø ~ h; i = a; w = k^{w}
2	Tooth	414. *ʂɨ-	98. *t͡ʂe-	96. **ʂɨ-	ʂ = t͡ʂ; ɨ = e
3	Two	352. *ɾa-ßɨta[41]	61. *beta	24. **bɨta	ß = b; ɨ = e
4	Liver	438. *tak^{w}a	403. *tak^{w}a	104. **tak^{w}a	
5	Leaf	325. pɨʔi	337. *pei 'to fan'	**pɨʔi	ɨ = e; ʔ = ʔ ~ ø
6	Bone	398. *ʂao[42]	96. *t͡ʂau	93. **ʂau	ʂ = t͡ʂ; o = u
7	Tongue	47. *hana[43]	12. *ana	46. **hana	h = ø ~ h
8	Hand	*mɨ-	282. *me-	70. **mɨ-	ɨ = e
9	Night	494. *(ya)mɨtV[44]	290. *meta	71. **mɨta	ɨ = e
10	Skin	89. *ßitsi	72. *biti	22. **bitsi	ß = b; ts = t
11	Fire	125. *tsiʔi[45]	*ti[46]	**tsiʔi	ts = t; ʔ = ʔ ~ ø
12	Knee	359. *ɾã-	128. *da	37. **da-n	ɾ = d; Ṽ = V
13	Blood	141. *himi[47]	11. *ami	48. **hemi	h = ø ~ h; i = a
14	Breast	429. *ʂo-	53. *ạtsu	**ạsu	a?; ʂ = t͡ʂ, o = u
15	Sun	63. *ßari	37. *badi 'moon'	16. **badi	ß = b; ɾ = d
16	You	246. *mi	292. *mi	72. **mi	

[37] Although we use Shell's RP cognate sets numbering, the forms in Table 5 are meant to belong to pP.
[38] See Appendices A and B for the corresponding Pano and Takana lexical items.
[39] In this and the following tables only sound correspondences between non-identical segments are listed.
[40] Shell (1975) does not posit an initial h in sets 147 'tree', 141 'blood', and 47 'tongue'. We do posit this initial consonant following Zariquiey (2006). A similar analysis was provided by Oliveira (2014), and Zariquiey & Valenzuela (2022). Girard (1971: 164) reconstructs an initial h to pPT.
[41] Valenzuela (2003: 88) analyzes this numeral as diachronically derived from the prefix *ra- 'body' + the comitative *-ßi ~ -ßitã (Shell 1975: 126, 71). As shown in Table 7, **bita reconstructs to pPT.
[42] Shell (1975: 174, 398) and Oliveira (2014: 459, 398) reconstruct *ʂao. Kasharari presents the form ʂahu [ʂa'h^{w}u] (Lanes 2005, in Oliveira 2014). For Matses/Mayoruna we consider as evidence the final consonant in ***mɨ-ʂ*** 'wrist bone', ***tai-ʂ*** 'ankle bone', and ***ʂomoʂ*** 'needle made of bone' (Fleck et al. 2012).
[43] Shell (1975: 122, 47) posits *ana, while we reconstruct the initial *h following Zariquiey (2006), Oliveira (2014), and Zariquiey & Valenzuela (2022).
[44] We do not have an explanation for the form *ya* in *yamita* in Pano, but *mit* has the minimun CVC structure required for cognate identification.
[45] Shell (1975: 134, 125) posits *tʃiʔi.
[46] Girard (1971: 122, 419) purposes *tiki, though he adds that the Takana forms may be based on *ti only.
[47] Shell (1975: 136, 141) posits *imi, while we reconstruct the initial *h following Zariquiey (2006), Oliveira (2014), and Zariquiey & Valenzuela (2022).

17	Come	70. *ßɨ- ‘come, bring’	*be- ‘bring’	24. **bɨ-	ß = b; ɨ = e
18	I	11. *ʔɨ	151. *e	11. **ʔɨ	ʔ = ʔ ~ ø; ɨ = e

Girard (1971) provides 3 additional proto-Pano-Takana reconstructions for items in the ASJP list that we decided to exclude.

(4) 65. pPT **ma-, manu-: pP *manu- ‘to forget’, *mawa- ‘to die’
pT *ma- ‘to die’, manu- ‘to die’ (p. 166)

66. pPT **manVkanV: pP *makaNV[48] ‘stone, chopper, pestle’
pT *a-maka ‘mortar, chopper, grinder’

8. pPT **ʔina: pP *ʔina ‘dog/jaguar’
pT *ina ‘tail, feather, hair’ (p. 161)

Let us first comment on Girard’s set 65. Shell (1975: 148, 218) posits *mano- for RP, based on Kakataibo *manu-* ‘forget’ and Hantxa Kuin *manu-* ‘miss sb’. However, we have not found similar forms in the Northern languages or Kasharari. Moreover, the RP form may be alternatively analyzed as bimorphemic, consisting of the stem *nu- (transitive)/*nu-t (intransitive) and the body-part prefix *ma- ‘head’.[49] If this hypothesis is correct, combinations of the same stem with a different body-part prefix may be available. In fact, the Northern Pano language Mayoruna/Matses registers the verb *bɨdnud-* ~ *bɨnnud-* ‘become lost’ which under this analysis contains the body-part prefix *bɨ-* ‘face/eye’, while Shipibo-Konibo registers verbs involving both body-part prefixes, *ma-* and *bɨ-*: *manu-* ‘go looking for sb’, *manut-* ‘dissappear, get lost’; *bɨnu-* ‘forget’, *bɨnut-* ‘get lost’. Since Takana languages have the forms *ma-, manu-* ‘to die’, where the segment /ma/ seems to contain the basic meaning of the verb, we may not be dealing with a pP and pT cognate.

As for set 66, the RP form *makaNV ‘stone’ lacks a reflex in Kakataibo, Kasharari, and the Northern languages according to the data at our disposal. Therefore, it does not comply with our standards for proto-Pano reconstruction (§5.1). Turning to proto-Takana, there may be sufficient evidence to propose *maka-na: *makana* ‘gravel’ (Cavineña), *mahana* ‘stone’ (Araona), and possibly also *mahaita* ‘land termite nest’ (Tacana). Given that a similar form cannot be reconstructed for proto-Pano, we could be dealing with a relatively early loan from Takana into some Central-Southern Pano languages.

Girard’s reconstruction **ʔina in set 8 presents two types of problems. First, the semantic similarity between the alleged cognates seems questionable. The Takana terms translate as ‘dog’ only in Ese’ Ejja (*iñaewa* ‘dog’), but as ‘tail, feather, hair’ in the sister languages: Cavineña *ina* ‘tail’ (Girard 1971: 81, 165; but cf. Camp & Liccardi 1989: 59 who list *iwa*); Tacana *-inua* ‘hair’, *-ina* ‘leaf, feather’ (Buckley de Ottaviano & Ottaviano 1989: 197, 200); Araona *-iña* ‘feather’, *shoa-iña* ‘hair’ (Pitman 1981: 200). Second, Girard cites a presumed proto-Pano form *ʔina ‘dog, jaguar’, but this differs from Shell’s RP *ʔino ‘dog, jaguar’ (set 22). That is, Girard confused *ʔina with *ʔino.

An additional pair of items have the same meaning and very similar forms in the two group of languages. Despite these resemblances, they are excluded from our list of probable cognates given the absence of regular sound correspondences.

[48] The first vowel is nasalized in Shell (1965: 192, 212) and thus in Girard (1971). This feature is omitted in Shell (1975).
[49] We are thankful to Sanderson Oliveira for suggesting the bimorphemic analysis to us.

(5) pP *hinɨ ‘water’ pT *na ‘water’
(Shell 1975: 135, set 132: *ɨnɨ; Girard 1971: 167)

pP *mana ‘hill’ pT *mata ‘hill, tip, top’
(Shell 1975: 147, set 215; Girard 1971: 166, set 62)

In sum, following a strict definition of cognate in comparing pP and pT terms, we have shown that at least 18 of the 40 basic vocabulary items in the ASJP list might be cognate. This number is particularly high given the estimated time-depth of their separation, *ca.* 3,900 years (Holman et al. 2011). Especially noteworthy is the fact that 9 of the 18 probable cognates refer to parts of the body: ‘tooth’, ‘liver’, ‘bone’, ‘tongue’, ‘hand’, ‘skin’, ‘knee’, ‘blood’, and ‘breast’; an additional item, ‘leaf’, denotes the part of a plant. We believe that these results afford robust evidence in support of the Pano-Takana Hypothesis given that body-part terminology is often rendered as basic vocabulary.[50] Furthermore, there are 8 more cognates in this semantic field, which are listed in Table 6.

Table 6. Proto-Pano-Takana cognates referring to parts of the body and parts of plants

Gloss	proto-Pano	proto-Takana	proto-Pano-Takana	sound corresp.[51]
Flesh	258. *nami	362. *ɾami	78. **Nami	n = ɾ
Fat	412. *ʂɨni	105. *t̪seri	99. **s̪ɨNi	ʂ = t̪s; ɨ = e; n = ɾ
Fingernail	239. *mĩ-tsis[i][52]	*metiji[53]	**mɨ-tsizi	ɨ = e; ṽ = v; ts = t; s ~ t = j
Foot, leg	*ta- ‘foot’	398. *ta- ‘leg’	103.**ta-	
Lip, edge	155. *kʷɨ-	243. *kʷe(i)-	59. **kʷɨ ~ kɨ-	ɨ = e
Cheek	440. *tamo[54]	*tamu[55]	105. **tamu	o = u
Mouth	158 *kʷɨʂa[CV]	232. *kʷat͡ʂa	**kʷeʂa	ɨ = a (irregular); ʂ = t͡ʂ
Elbow	* βaʂ(u)-	29. –bat͡ʂu	**baʂu	β = b; ṽ = v; ʂ = t͡ʂ; o = u

At this point it is of interest to bring up the findings in Zariquiey & Valenzuela (2022), which specifically deals with body-part terms in pP and pT. In addition to discussing the probable cognates within this semantic domain,[56] this work shows that body-part terms occur in very similar morphosyntactic constructions in languages from the two language families: noun incorporation in Takana and verb prefixation in Pano (Pano languages lack body-part noun incorporation, whereas Takana languages lack body-part prefixes). The next Ese’ Ejja

[50] For more discussion on body-part terminology and the Pano-Takana Hypothesis, see Zariquiey & Valenzuela (2022); for Pano, see Zariquiey et al. (2023).
[51] In this and the following tables only sound correspondences between non-identical segments are listed.
[52] In contrast, Shell (1975:151, 239) reconstructs *mĩtsis[t]I and Oliveira (2014:428, 239) *mĩtsis.
[53] Girard (1971:166, 70) offers this pT form when dealing with **mɨ- ‘hand.’ However, he does not provide a pPT reconstruction.
[54] Matsés has the nouns *bu* ‘hair’ and *tambú* ‘hair on the cheek.’ Fleck analyzes *tan-* as a prefix. However, we may be dealing with a shortened form of *tamu.* Alternatively, there could be a pP form *tan-
[55] Girard (1971:170, 105) reconstructs pPT **tamu but does not offer a pT form. We posit pT *tamu based on: Cavineña *–tamu*, Reyesano *ebu-tamu* (Guillaume p. c., March 2017), and Ese Ejja *-shemo*.
[56] Zariquiey & Valenzuela (2022) benefited from the same talk that served as the basis for the present work (see footnote 1). Both articles propose the same set of body-part cognates: tooth, liver, leaf, bone, tongue, hand, skin/hide, knee, blood, breast, flesh, fat, fingernail, foot/leg, lip/edge, cheek, mouth, elbow.

and Kasharari examples involve the reflexes of **mɨ- ‘hand’ (orthography is kept as in the original sources).

Ese’ Ejja (Takana, Chamik Branch) body-part noun incorporation

(6) *Iñawewa* *e-pi* *neki* *akwi=jo* ***me**-neki*.
dog RES-straight stand tree=LOC hand-stand.PRES
‘The dog is standing straight, with his paw on the tree (lit. he hand-stand).’
{KaFWA.089} (Zariquiey & Valenzuela 2022: 462; originally in Vuillermet 2012: 517)
The noun for ‘hand’ is *e-me*.

Kasharari (Pano, Southeastern Branch) body-part verb prefixation

(7) *ɨ-l* *mi* ***mɨ**-buria-tu*
1SG-ERG 2SG:ABS HAND-tie-PFV
‘I tied up your hands.’ (Zariquiey & Valenzuela 2022: 461; originally in Valenzuela & Oliveira 2012) The noun for ‘hand’ is *mɨkɨlɨ*.

Zariquiey & Valenzuela (2022) posit that body-part noun incorporation of the sort found in Takana languages was likely part of pPT grammar. Then, after the separation of the two language clusters this construction developed into body-part prefixation in Pano.

6. Grammatical evidence in support of the Pano-Takana hypothesis

6.1 Grammatical morphemes

Alongside numerous lexical resemblances, Pano and Takana languages share several morphological, syntactic, and phonological traits (Valenzuela & Guillaume 2017: 30-31). In this section we provide a list of probable grammatical cognates. Most of the morphemes compared are monosyllabic and, thus, the likelihood that their similarity be due to chance is not negligible. Nevertheless, it is the recurrence of the observed affinities and the fact that some of the morphemes involved occur in very similar morphosyntactic contexts that make the evidence compelling. Let us consider Table 7 containing personal pronouns, demonstratives, and various nominal and verbal markers.

Table 7. Proto-Pano-Takana grammatical morphemes[57]

	proto-Pano	proto-Takana	proto-Pano-Takana	pP and pT sound corresp.
1ST SG ‘I’	11. *ʔɨ	151. *e	11. **ʔɨ	ʔ = ʔ ~ Ø; ɨ = e
2ND SG ‘you’	246. *mi	292. *mi	72. **mi	
DEMONSTRATIVE	*ʔo- distal[58]	442. *u- ‘this’ ‘he’	14. **ʔu-	ʔ = ʔ ~ Ø; o = u
DEMONSTRATIVE	*nɨ-[59] proximate	363. *ree- proximate	79. **Nɨ-	n = ɾ; ɨ = e
GENITIVE	*-wɨ̃[60]	241. *-k^{w}e	44. **-g^{w}ɨ-n	w = k^{w}, ɨ = e; Ṽ = V

[57] See Appendices C and D for Pano and Takana grammatical morphemes.
[58] In the Headwaters languages, u- additionally functions as 3rd person singular pronoun.
[59] Absent from Shell (1975), but see Girard (1971: 167, 79).
[60] Absent from Shell (1975), but see Girard (1971: 164, 44). Alternatively, *-wɨ̃ may be analyzed as *-wɨ + *-n, where -n is the multifunctional morpheme indicating ergative, instrumental, and possessive.

IMPERATIVE	477. *-wɨ[61]	240. *-k^{w}e	43. **-g^{w}ɨ	w = k^{w}, ɨ = e
'GOING DOWN, DOWNWARD'	*-ßut [62]	78. *-bute[63]	**-but[ɨ][64]	β = b; Ø = e (irregular)
'DO COMING'	*-ßɨ[…] (Guillaume 2017: 254)	*-be (Guillaume 2017: 233)	**-bɨ	β = b; ɨ = e
DESIDERATIVE	*-katsa[65]	*-katsa	53. **-katsa	
NEGATIVE	493. *-[ya]ma (verbal)[66]	9. *-(a)ma (verbal and nominal)	61. **-(…a)ma[67]	y = Ø (irregular)
CAUSATIVE	202. *-m[a][68]	289. *-me[re][69]	**-m[a/e]	
AUGMENTATIVE	*pa [70]	330. *-pa	81. **-pa	
'DO (TR.), AUXILIARY (TR.)	1. *ʔak-[71]	1. *a-	1. **ʔak-[72]	ʔ = ʔ ~ Ø; k = Ø (irregular)
TRANSITIVIZER	466. *-wa	2. *-a	1.**-[w]a	w = Ø (irregular)
DETRANSITIVIZER, REFLEXIVE	*-t[73]	422. *-ti	**-t[i]	Ø = /i/
ERGATIVE	*-n	361. *-ra	**-N[a]	n = ɾ; Ø = a (irregular)

[61] Present in Kasharari and the Central-Southern languages. In Kakataibo, the imperative *-wɨ ~ -ɨ* is attested in traditional songs. In the Northern Pano languages the imperative is not morphologically marked, which we interpret as an innovation.

[62] For pP Girard (1971: 163, 26) proposes *-bu 'down', while we consider *-but more accurate based on Matses/Mayoruna *-bud* and Kakataibo *-but*.

[63] For pT Girard (1971: 163, 26) reconstructs *-bu 'down', whereas we posit *-bute based on Cavineña *-bute/-butya,* Ese' Ejja-*'oke/-'okya*, Araona *-bote*, Takana *-ute,* Reyesano *-bute* (Guillaume 2017: 232).

[64] For pPT Girard (1971: 163, 26) reconstructs the verb **bu-ti 'go down, descend'. Here we propose the suffix **-but[ɨ]. See §6.2.

[65] Shell (1975: 141, 174) and Oliveira (2014: 415, 174) reconstruct *-kas/*-katsi. Nevertheless, in Kakataibo the *-i* in *-katsi* can be segmented out, and in Kasharari the desiderative is *-katsa*. For these reasons we propose *-katsa as the pP morpheme. A similar form can be posited for pT based on Cavineña *-kara*, Tacana *-tsa* (Buckley de Ottaviano & Ottaviano 1989: 115, 204), Araona *-hae* (Pitman 1980: 37-38), Ese' Ejja *-sa* (see ex. 27). This analysis assumes that only one syllable of the desiderative was kept in the different Takana languages; some retained a reflex of *-ka,* while others retained a reflex of *-tsa*. For pPT Girard (1971) posits **-ka… (apparently based on the data on p. 86, set 197), while we believe that **-katsa is more accurate.

[66] Following Shell (1975) and Oliveira (2014), we provisionally maintain the pP verbal negative marker *–[ya]ma, although *-yama* has not been attested in the Northern or Southeastern languages. Moreover, for Shipibo-Konibo it has been proposed that *–yama* derives from the negative existential verb of the same form (Valenzuela 2003: 87). In turn, the negative existential may derive from *–ya* 'having' + *-ma* negative.

[67] Recall from §4 that this is a widely shared form in South America. The same applies to the causative below.

[68] We provisionally list *-m[a], following Shell (1975: 145, 202) and Oliveira (2014: 421, 202). However, the nature of the vowel needs revision. The presence of *-mi* in Kakataibo and *-me* in the Northern languages suggest the form *-me, a vowel that has not (yet) been reconstructed to pP.

[69] Girard reconstructs *-me[re] based on Tacana *–me* and Cavineña *–mere*. To this we can now add Ese' Ejja *-mee* and Araona *-me*.

[70] Absent in Shell, but see Girard (1971: 168, 81).

[71] Shell (1975: 115, 1) RP *ʔa-; Oliveira (2014: 381, 1) pP *ʔak-.

[72] This transitive auxiliary also takes part in transitivity harmony constructions in both families (Valenzuela 2017; section 6.3 in this paper).

[73] Based on Shipibo-Konibo *-t* (other allomorphs); Kakataibo *-t* (also *-meet, -kaat*); Matis *-ad*. Kasharari has *-nã*, which may be the reciprocal suffix encroaching into the reflexive field (Valenzuela & Oliveira 2012).

PREVIOUS EVENT, SAME-SUBJECT	*-ʂo-n[74]	*-.ʈsu [75]	**- .su	ʂ = t͡ʂ, o = u
COMITATIVE, 'ALONG WITH'	*ßɨta	61. *beta	24. **bɨta	β = b; ɨ = e

Although the relationship between an interrogative pronoun and a 3rd person pronoun is not an established path for diachronic change (i.e., neither of them is a common source for the other one), we have found an interesting bidirectional resemblance between these categories. Basically, the pP 3rd person singular pronoun and the medial demonstrative resemble the stem of interrogative pronouns in pT and, conversely, the pT 3rd person pronoun resembles the pP interrogative 'who'. This is shown in Table 8.

Table 8. Proto-Pano-Takana 3rd person singular and interrogative morphemes

	proto-Pano	proto-Takana	proto-Pano-Takana	pP and pT sound corresp.
PRONOUN: 3RD PERSON / INT.	43. ***ha**[76] 3rd sing., that'	3. ***a-** stem of int. pronouns	45. ****ha**	
PRONOUN: INT. / 3 RD PERSON	116. ***tso-** [77] who'	431. ***tu** 3rd person	****tsu-**	ts = t, o = u

As stated above, grammatical resemblances between Pano and Takana concern not only individual morphemes but also the specific constructions in which these appear. Below we discuss motion and auxiliary morphemes, which may present alternate forms in agreement with the transitivity class of the base/lexical verb. In addition, we discuss a dependent clause marker coding sequentiality of events and subject coreferentiality.

6.2 Motion morphemes and transitivity harmony

As shown in Table 7 above, two motion verbal suffixes have been reconstructed to pPT: **-but[ɨ] 'going down, downward' and **-bɨ 'coming'. Reflexes of **-bɨ have been analyzed as associated motion suffixes in both families, while reflexes of **-but[ɨ] have been considered as such in Pano but as simple motion suffixes in Takana (Guillaume 2017: 232, 243).[78] A further grammatical affinity concerns the fact that some (associated) motion suffixes exhibit transitivity harmony; i.e., they display different forms to match the transitivity value of their base (Valenzuela 2003, 2011, 2017). This morphosyntactic restriction is attested with regard to the reflexes of **-but[ɨ] 'going down, downward' in the Takana languages Cavineña and Ese' Ejja, and the Pano language Kakataibo. Transitivity harmony also applies to the reflexes of **-ßɨ 'do coming' in Pano languages. Let us consider the following Kakataibo (Pano) and Cavineña (Takana) examples. In the former language *-but* and *-pat* combine with intransitive and transitive stems, respectively; in the latter language *-bute* and *-butya* follow an analogous distribution (orthography is kept as in the original sources).

[74] Absent in Shell (1975). It requires that the matrix verb be transitive. According to Valenzuela (2003, 2005), the case agreement marker *-n* was probably added to the sequential *-ʂo* at a later stage. See §6.4.
[75] Absent in Girard (1971). This is a sequential, same-subject marker. See §6.4.
[76] Shell (1975: 122, 43) *aa, but Oliveira (2014: 389, 43) *ha[a].
[77] Shell (1975: 133, 116) and Oliveira (2014: 115) posit *tso[a]. However, the final /a/ is segmentable.
[78] Associated motion morphemes are those that combine with non-motion verbs to indicate that an action depicted by the verb is associated with a backgrounded motion (Guillaume 2017).

Kakataibo (Pano)

(8) *a* *buan-i* *ka* *kwan-akɨ-ʂ-a* *tapan=n*
that:P bring-S/A>S:SE NAR:3 go-REM.PST-3-NON.PROX raft=INS
cuatro *tapan=n* *ka* *rit-**but**-akɨ-ʂ-a*
four raft=INS nar:3 go.together-**DOWN:INTR**-REM.PST-3-NON.PROX
'Bringing those (rafts), they went downstream together in four rafts.'

(9) *ronru-tankɨʂun* *ka=is=a* *ʂɨmɨn* *'a-akɨ-ʂ-a*
climb-S/A>A:PE NAR=REP=3 kinkajou:ABS kill-REM.PST-3-NON.PROX
pia=n *pia=n* *'a-ʂun* *'a-ʂun*
arrow=INS arrow=INS kill-S/A>A kill-S/A>A
*ni-**pat**-akɨ-ʂ-a*
throw-**DOWN:TR**-REM.PST-3-NON.PROX
'It is said that, after he climbed, he killed the kinkajous, killing them with arrows, killing them with arrows, he threw the kinkajous down.'
(Zariquiey 2011: 454)

Cavineña (Takana)

(10) *Ani-**bute**-kwe!*
sit-**GO.DOWN.INTR**-IMP.SG
'Have a seat!' (ci003) (Guillaume 2008: 316)

(11) *E-kwe* *e-nasi=bakwe* *iya-**butya**-kware.*
1SG-GEN 1-older.sister=CONTR place-**GO.DOWN.TR**-REM.PST
'She (my mother) put my older sister down (from her shoulder).' (ib053)
(Guillaume 2008: 316)

Crucially, the verbal suffixes illustrated above (except for Kakataibo *-pat*) resulted from the grammaticalization of independent motion verbs that also reconstruct to pPT. Thus, the source of pPT **-but[ɨ] is the independent verb of probably identical form reconstructed based on pP *ßut[o/i]- and pT *bute. The reflexes in today Pano languages are: Mayoruna/Matsés *bud*, Kakataibo *ʔi-buti,* Kapanawa *boto,* Hantxa Kuin *butu*, Sharanawa and Yaminawa *foto*; the reflexes in today Takana languages are: Araona *bote*, Reyesano *buteti*, Tacana *bute*, Cavineña *buteya*.

Let us now examine the pPT associated motion suffix **-bɨ. Guillaume (2017) reconstructs four pT associated motion suffixes, one of which is *-be 'do coming'. The reflexes provided by the author are: Cavineña *-be* (DO.IPFV.COMING), Ese' Ejja (Portachuelo) *-hebe* (DO.IPFV.COMING.BACK), Takana *-be* (DO.IPFV.COMING), and Reyesano *-bebe* (QUICKLY) (p. 233). To this, we can add Araona *-bea* 'towards (the speaker, the point set in discourse)' (Pitman 1980: 57, 83, 98; Emkow 2006: 533; the /a/ may be segmentable). Sentences (12) and (13) below illustrate this suffix in Cavineña and Ese' Ejja, respectively.

Cavineña (Takana, Kavinik Branch)

(12) *Hadya=tu* *amena* *ara-**be**-kware* *era.*
so=3SG BM eat-DO.IPFV.COMING.TEMP-REM.PST 1SG.ERG
'And so, I was coming eating.' (Guillaume 2017: 219)

Ese' Ejja (Takana, Chamik Branch)

(13) *Ohaya* *iñawewa* *besa-besa-ba'e* *oke*
3.GEN dog swim-swim-float/PRES 3ALL.HUM
*besa-**hebe**-ani*.
swim-DO.COMING.BACK-PRES
'And his dog is swimming to him (the owner), he is swimming back to him.'
{SWAF.063} (Vuillermet 2012: 277)

As for Pano, these languages feature a number of associated motion suffixes that involve a venitive meaning and contain /ßɨ/. The following morphemes translate as 'do coming, come and do': Mayoruna/Matses *-bɨtsen* and *-bɨ*, Kakataibo *-bɨtsin,* Chakobo *-bɨna*, Shipibo-Konibo *-bɨiran* and *-bɨ*, Yaminawa *-fɨran*, Amawaka *-vɨran*, Hantxa Kuin *-bidan* (Guillaume 2017: 254). Guillaume reconstructs the corresponding pP verbal suffix as *-ßɨ. This morpheme clearly originates in the segmentally identical pP verb, which has reflexes in all subdivisions of the family,[79] and translates as 'bring' as well as 'come (pl.)' in some languages.[80] Furthermore, suffixes that developed from this verb tend to exhibit transitivity harmony, being only used when the base verb is transitive (or when the subject is plural regardless of base verb transitivity in certain languages) (Valenzuela 2017). Table 9, based on Guillaume (2017: 236-238), lists the Pano venitive associated motion suffixes.

Table 9. Venitive associated motion suffixes and transitivity harmony in Pano

LANGUAGE	TRANSITIVE BASE VERB	INTRANSITIVE BASE VERB
Kakataibo	*-**ßi**tsin*	*-**kwa**tsin*
Mayoruna/Matses	*-**ßi**tsen*	*-**kwɨ**tsen*
Shipibo-Konibo	*-**ßi**iran*	*-**k**iran*
Yaminawa	*-**fi**ra(n)*	*-**kɨ**ra(n)*
\Hantxa Kuin	*-**ß**idan*	*-**k**idan*
Chakobo	*-**ßi**na,* *-**ßi**ria*	*-**ho**na,* *-**ki**ria*

As shown in Table 9, the Pano venitive forms that combine with transitive verbs involve *-ß(i)*, while their intransitive counterparts tend to present *-kwa ~ -kwɨ, -k(i/ɨ).* These suffixes most probably developed from the pPT independent motion verbs that Girard (1971) reconstructs as **bɨ- 'bring (along)' (pP *bɨ- and pT *be-; p. 162, set 24) and **k^{w}a- 'go' (pP * k^{w}a and pT *k^{w}a; p. 165, set 58) (the verb *kwa-* 'go' appears in ex. (8)).[81]

While one may entertain the possibility that a trait such as transitivity harmony be the result of contact induced language change, in these cases we are dealing with almost identical motion suffixes that reconstruct to pP and pT. Moreover, also the independent verbs from

[79] Shell (1975: 126, 70) and Oliveira (2014: 394, 70) reconstruct *ßi- 'bring', which has the reflex *ßi-* in Korubo, Matis, and Mayoruna/Matses (Northern Pano); Kasharari (Southeastern Pano); Kakataibo (Western Pano); and several Central-Southern languages (Shipibo-Konibo, Kapanawa, Hantxa Kuin, Amawaka (+ high tone), Yawanawa, Chakobo). The reflex *ɸi-* is attested in Marinawa, Sharanawa, Chaninawa, and Yaminawa.
[80] 'Go (sing.)' is coded by the suppletive stem *k^{w}a-, which is the source of the right-hand allomorphs in Table 9.
[81] As for Chakobo *-hona*, it involves the root for 'come (sing.)', reconstructed as *o- by Shell (1975: 160, 296) and *ho- by Oliveira (2014: 439, 296).

which the motion suffixes derived reconstruct to the protolanguages. Hence, the evidence provided in this section clearly points to genetic relationship over language contact.[82]

6.3 Auxiliaries and transitivity harmony

6.3.1 Auxiliary alternation

Yet another interesting feature shared by Pano and Takana grammars is the presence of a pair of auxiliaries that differ in transitivity (and often translate as verbs of saying). The transitive auxiliaries reconstruct to pP and pT as *ʔak- and *a- respectively. In Pano languages the intransitive versions are *ʔiʔ-, i(k)-, ki-*, *ke-*, whereas in Takana these are *po-, pu-, pwa- kwa-, hu-*. Lexical verb pairs (diachronically) involving the auxiliaries are also attested in both language clusters. For instance, in Shipibo-Konibo there are predicate pairs formed by an onomatopoeic root and the auxiliaries *ak-* (tr.) and *ik-* (intr.): *to'* ***ak***- 'shoot' ≠ *to'* ***ik***- 'shoot oneself', *hohó* ***ak***- 'bark at' ≠ *hohó* ***ik***- 'bark', *ʂonʂin* ***ak***- 'whistle at' ≠ *ʂonʂin* ***ik***- 'whistle' (Valenzuela 2003).

Some Pano languages feature verb pairs whose endings reveal the diachronic involvement of the auxiliaries. Consider the data in (14)-(16) below, from languages representing three major branches of Pano. (In Yaminawa, the intransitive *-ki* is realized as *-kɨ* when the base features the vowel /ɨ/. Also, /k/ undergoes deletion when the base ends in a sibilant (Valenzuela 2017: 416)).

Yaminawa (Pano, Central-Southern Branch, Headwaters B; Faust & Loos 2002)

(14)		
	*tsɨ**ka***- 'take out'	*tsɨ**ki***- 'come out'
	*fɨʂ**a***- 'scratch'	*fɨʂ**i***- 'scratch oneself'
	*pos**a***- 'break (tr.)'	*pos**i***- 'break (intr.)'
	*cho**ka***- 'wash'	*cho**ki***- 'wash oneself'

Kakataibo (Pano, Central-Southern Branch, Preandine/Western Subgroup; Shell 1987)

(15)		
	ka- 'say (tr.)'	***ki***- 'say (intr.), *be*'
	*ran**ka***- 'drag'	*ran**ki***- 'be dragged'
	*ʃaí**ka***- 'move sth'.	*ʃaí**ki***- 'tremble'
	*chan**ka***- 'break sth. into pieces'	*chan**ki***- 'break into pieces (intr.)'
	*naʂ**ka***- 'insert sth'.	*naʂ**ki***- 'be inserted'
	*sɨn**ka***- 'sway sth./sb'.	*sɨn**ki***- 'sway (intr.)'
	*ʃĩn**ka***- 'blow sb'.s nose'	*ʃĩn**ki***- 'blow one's nose'

Matses (Pano, Northern Branch; Fleck 2003)

(16)		
	ka- 'say to, tell'	***ke***- 'say (intr.)'
	*on**ka***- 'tease verbally, flirt (tr.)'	*on**ke***- 'talk' (intr.)
	*poʂ**ka***- 'break something'	*poʂ**ke***- 'break (intr.)'
	*didi**ka***- 'hang sth'.	*didi**ke***- 'be hanging'
	*ʂuk**ka*** 'fan sb., fan fire'	*ʂuk**ke***- 'fan self, sway'
	*tadan**ka*** 'cause to slip'	*tadan**ke***- 'slip'
	*pichi**ka***- 'burn sth'.	*pichi**ke***- 'be on fire, burn self'

[82] Detailed comparison of the Pano and Takana motion suffixes seems to be a promising area for future research (see Guillaume 2017: 224, 254).

As in Pano, auxiliary alternation is used in Takana to derive different transitivity classes of verbs. The examples below come from languages belonging to two of the three main branches in the family. The verbs in (18) are Spanish loans.

Cavineña (Takana, Kavinik Branch; Guillaume 2008: 282-283)

(17) *endya* ***a-*** 'say 'yes' to sb'. *endya* ***hu-*** 'say 'yes', accept'
kwatsabihi ***a-*** 'say sth'. *kwatsabihi* ***hu-*** 'speak'

Ese' Ejja (Takana, Chamik Branch; Vuillermet 2012: 381 and 385-386)

(18) *tragado* ***a-*** 'swallow sb'.
invitado ***a-*** 'invite sb'.
alcanza ***kwa-*** 'suffice'
parado ***kwa-*** 'stand'

Like Ese' Ejja, the Pano language Chakobo resorts to auxiliary alternation when borrowing verbs from Spanish; intransitive verbs take *i-* (*jugar i-* 'play'), while transitive ones take *a-* (*grabar a-* 'record sb'.) (Valenzuela 2017: 429-430).[83]

6.3.2 Auxiliary alternation and transitivity harmony

Transitive and intransitive auxiliaries, or suffixes derived with the involvement of the auxiliaries, are attested in constructions exhibiting transitivity harmony, both in Pano and Takana (Valenzuela 2017: 442-443). For example, in Chakobo (Pano), a suffix that translates as 'now' features the allomorphs *-ts****a*** and *-ts****i***; the former attaches to transitive verbs (*pi-tsa-* 'eat now') and the latter to intransitive ones (*haba-tsi-* 'run now'). Note that the allomorphs bear the endings /i/ and /a/, respectively. Similarly, the Takana language Cavineña has a series of verb suffixes that instantiate alternate forms depending on whether they attach to an intransitive or a transitive base. Importantly, all allomorphs that combine with a transitive base end in /a/, which suggests that grammaticalization of the transitive auxiliary took place (the distribution of *-bute* and *-butya* can be observed in (10)-(11)).

Cavineña (Takana, Kavinik Branch; Guillaume 2004: 124-127)

(19) 'stand' *-neti* (intr.) *-nity****a*** (tr.)
'go down' *-bute* (intr.) *-buty****a*** (tr.)
'do completely' *-tere* (intr.) *-tiry****a*** (tr.)
negative attitude *-hara* (intr.) *-wan****a*** (tr.)

In a second Takana language, Ese' Ejja (Chamik Branch), the posture verb *ani-* 'sit' has grammaticalized into the present tense suffix. This marker has two allomorphs whose distribution is largely determined by transitivity harmony: *-ani* (present, intransitive; non-speech-act participant) ~ *-aɲa* (present, transitive, speech-act participant) (Vuillermet 2012: 451). Again, it is highly probable that the transitive version used with the 1st and 2nd persons developed by adding the transitive auxiliary (which also functions as transitivizer) to the posture verb: *ani-* + *-a* > *anja* > *aɲa* (Valenzuela 2017: 441).

Furthermore, languages in the two families feature complex predicates whereby a lexical verb interacts with an auxiliary. Some of these constructions comply with the

[83] In Mayoruna/Matses transitive borrowed verbs take *-wa*, while intransitives take no additional marking (Valenzuela 2017: 430).

transitivity harmony constraint; i.e., the lexical verb and the auxiliary need to match with respect to (in)transitivity (Valenzuela 2017). For example, in Shipibo-Konibo exhortative sentences are formed by combining a jussive-marked lexical verb with an auxiliary bearing the imperative; the auxiliaries *ak-* and *ik-* are used with transitive and intransitive lexical verbs, respectively.[84]

Shipibo-Konibo (Pano, Central-Southern)

(20) *No=n* *aʂɨ́* *r=iki* *kikin* *hakon.*
1PL=ERG custom DIR.EV=COP extremely good
bakɨ=bo ***aʂi-a****-non* ***a(k)-****kan-wɨ.*
child-PL:ABS learn-TRNZ-JUSS AUX.TR-PL-IMP
'Our customs are very good. Let's teach the children!'

(21) *No=n* *ʃiro bɨwá=bo* *r=iki* *kikin* *mɨtsá.*
1PL=ERG shiro song=PL:ABS DIR.EV=COP extremely beautiful
bɨwa-*non* ***i(k)-****kan-wɨ.*
sing-JUSS AUX.INTR-PL-IMP
'Our *shiro* songs (love songs) are very beautiful. Let's sing!'

A similar pattern is attested in a couple of Kakataibo constructions. That is, they also combine a lexical verb with an auxiliary, and the auxiliary selection depends on the transitivity class of the lexical verb. In the prohibitive sentences below, the lexical verbs carry the switch-reference markers *-ʂun* or *-aʂ* in correlation with the transitive and intransitive auxiliaries, respectively.

Kakataibo (Pano, Western Branch; Zariquiey 2011)

(22) *ni-pat****-ʂun****=ma* *ka* ***'a'***
throw-DOWN:TRAN-S/A>A=NEG NAR TRAN.AUX:IMP
'Don't throw it down!'

(23) *ni-pakɨt****-aʂ****=ma* *ka* ***'i'***
throw-DOWN:TRAN>INTR-S/A>S=NEG NAR INTR.AUX:IMP
'Don't fall down!'

Complex predicates involving a lexical verb plus an auxiliary, and complying with transitivity harmony, are also found in Takana languages. In Araona, verbs exhibit various types of combinatorial restrictions. For example, negation and habituality marking cannot cooccur in the same verb. In addition, the verb *tawi-* 'sleep' cannot directly take the imperative. In such instances, the lexical verb must be accompanied by an auxiliary so that the latter carries the necessary/additional TAM inflection. Consider (24)-(25) where the lexical verb determines the transitivity value of the predicate, and thus the choice of auxiliary.

Araona (Takana, Takanik Branch; Emkow 2006: 419)

(24) *Dãti=kana* *pi=****di****=ma* ***a****=lelahai.*
tortoise=PL NEG1=eat=NEG2 AUX.TR=HAB
'(We) have never eaten tortoises.'

[84] This construction is undergoing simplification, so that the intransitive auxiliary is gradually encroaching into the domain of its transitive counterpart.

(25) *Pi-**tawi**-ma* ***po**=ke.*
NEG1-sleep-NEG2 AUX.INTR=IMP
'Don't sleep!'

Another Takana language, Ese' Ejja, has a type of complex predicate whereby a lexical non-inflecting verb combines with an auxiliary bearing the necessary person and tense/mood indexation. Crucially, the auxiliaries *po-* (intr.) and *a-* (tr.) are selected in agreement with the transitivity value of the lexical non-inflecting verb. (The verb *mimi-* 'speak, sing, roar' is intransitive.).

Ese' Ejja (Takana; Vuillermet 2012: 382)

(26) *Yaxa* ***mimi**-me* ***po**-ka-xi?*
how speak-MANNER be-EXT.OBL-EXT.OBL
'How shall I talk?' {KiSip.002}

(27) *Meemee owaya* ***ixya**-sa* ***a**-ka-ani.*
bee 3.ERG eat-DES do-3A-PRES
'He wants to eat the bees.' {SOFWA.029}

Summarizing, Pano and Takana languages feature two auxiliary verbs, intransitive and transitive; the latter reconstructs to pPT. Moreover, in both language families alternate auxiliarization is (diachronically) involved in the formation of transitive and intransitive verb pairs, or verbal suffixes whose allomorphic distribution is (largely) determined by the transitivity class of the host base. Transitivity harmony is also observed in complex predicates containing a lexical verb and an auxiliary; the latter are required to match the transitivity value of the former. The discussed similarities are attested in languages from different main branches of Pano and Takana and, thus, are best explained by linguistic inheritance rather than contact.

6.4 Clause-linkage involving sequentiality and argument coreferentiality

A shown in Table 7, pPT **= ʂu is posited as a dependency marker linking two clauses and coding event sequentiality as well as subject coreferentiality. Note the following pP and pT regular sound correspondence: pPT **ʂ: pP *ʂ; pT *ts.

Proto-Pano: *= ʂon (< *=ʂo + *=n)

Valenzuela (2003: chapter 20) reconstructs the proto-Pano "same-subject" marker *=ʂon, diachronically analyzable into *=ʂo + *=n. Valenzuela's hypothesis is as follows. The proto-morpheme *=ʂo was added to a verb-final dependent clause to signal that the event depicted by this clause preceded the event in its matrix clause and the subjects were coreferential. Furthermore, *=ʂo showed a tendency to restrict the syntactic function of the coreferential argument in the matrix clause to A (transitive subject). Subsequently, the already marked non-finite clause received a second layer of inflection which involved the core case-markers *=n, *=ʂ, and *=ø, corresponding to A, S, and P, respectively (this implies that such a tripartite case-marking system was present in certain constructions of the protolanguage). Through case agreement these inflectional morphemes indicated a semantic orientation of the marked clause towards a participant in the matrix clause. For instance, *=n indicated case agreement with / semantic orientation towards the matrix clause A argument. Later on, *=ʂo and *=n fused into a single morpheme. As a result of this process, in today Pano languages *=ʂon* or a similar form

takes part in the switch-reference system indicating that the event in the marked clause is prior to the event in the matrix clause, and the S/A of the marked clause is coreferential with the A of the matrix clause. In other words, it can be said that the marked clause is semantically oriented towards the matrix clause A and, hence, the matrix clause is transitive. Valenzuela coins the term "Participant Agreement" to refer to this typologically salient feature of Pano grammar. It must be noted that Valenzuela's reconstructive work is based on data from Mayoruna/Matses (Northern Branch), Kakataibo (Central-Southern Branch, Pre-andine/Western Subgroup), and other languages from the Ucayali and Headwaters Subgroups of the Central-Southern Branch; therefore, this work complies with the criteria established in §5.1.

The reflexes of pP *=ʂon in some daughter languages are as follows: Shipibo-Konibo *=ʂon* (Valenzuela 2003), Hantxa kuin *=ʂun* (Montag 1981: 584), Amawaka *=çon* (Sparing-Chávez 2012: 16), Chakobo *=ʂo*[85] (Valenzuela 2005: 193), Kakataibo *=ʂun* (Zariquiey 2011: 578), Matis *=ʂun* (Ferreira 2017: 390), Mayoruna/Matses *=ʂun* (Fleck 2003). For Kasharari, Valenzuela & Oliveira (2012) register *=ʂu*, without the case agreement or participant orientation layer. Crucially, this morpheme indicates previous event and subject coreferentiality, but does not require that the matrix clause be transitive (i.e., it does not code orientation towards an A argument). Examples (28)-(30) below illustrate the reflexes of pP *=ʂon in languages representing three different branches of Pano. The gloss PREV.S/A>A stands for 'previous event, coreferentiality between the S/A argument of the marked clause and the A argument of the matrix clause.'

Shipibo-Konibo (Pano, Central-Southern Branch)

(28) *Wai* *a-**ʂon**=ra,* *no=n* *ʂɨki* *bana-[ai].*
field make=PREV.S/A>A=DIR.EV 1PL=ERG corn:ABS sow-IPFV
'After preparing the field, we sow corn.'

Matis (Pano, Northern Branch)

(29) *Makɨ-n* *nes-**ʂun*** *atsa-Ø* *kodoka-a-ʂ.*
Makɨ-ERG bathe-PREV.A/S>A manioc-ABS cook-REC.PST-3.EXP
'Makɨ bathed and then cooked the manioc.' (Ferreira 2017: 392)

Kakataibo (Pano, Western Branch)

(30) *kwan-**ʂun*** *ka=na* *'ɨ=n* *'atsa* *pi-i-n*
go-PREV.S/A>A NAR=1SG 1SG=A manioc:ABS eat-IPFV-1/2
'Having gone, I am eating manioc.' (Zariquiey, forthc., p. 278)

Proto-Takana: *= ʈʂu

The pT switch-reference marker *=ʈʂu likely indicated that the event depicted by the marked clause preceded the event in its matrix clause and the subjects were coreferential. Reflexes of pT *= ʈʂu are found in three daughter languages representing two of the three branches of Takana: Araona *=tso* (Emkow 2006: 681), Takana *=su* (Buckley de Ottaviano & Ottaviano 1989: 106), and Cavineña *=atsu* ~ *=tsu* (*=atsu* attaches to monosyllabic stems; Guillaume 2008: 723). We posit that pT *=ʈʂu might be cognate with pP *=ʂo. But differently from Pano, Takana did not develop the additional case agreement layer. Nevertheless, Emkow (2006: 680-681) seems to suggest that Araona *=tso* requires that both linked clauses be either intransitive or transitive. If this interpretation is correct, the situation would be reminiscent of Valenzuela's

[85] Chakobo underwent /n/ deletion in syllable final position (Valenzuela & Iggesen 2007).

(2003) proposal that pP *=ʂo probably restricted the syntactic function of the coreferential argument in the matrix clause. Examples (31)-(32) below illustrate the reflexes of pT *=ʈʂu in languages from the Kavinik and Takanik branches.

Cavineña (Takana, Kavinik Branch)

(31) *Ka-bahehe-ti-**tsu*** *ʃana-nuka-kware*.
REF-prepare-REF-SS leave-REITR-REM.PST
'He prepared himself and left it (a viper) again.' vi022 (Guillaume 2004: 120)

Araona (Takana, Takanik Branch)

(32 *Tẽhe* *ʃakwa* *a=**tso**,* *zia* *bãna.*
field new make=SEQ corn cultivate
'After making the field (we) cultivate sweetcorn on it.' (Emkow 2006: 681)

The pT same-subject marker *=ʈʂu lacks a reflex in Ese' Ejja, the only representative of the Chamik Branch of Takana. This relevant finding is compatible with the alleged innovative nature of the Ese' Ejja's switch-reference system, as claimed by Valenzuela & Vuillermet (2016). These authors show that the Pano switch-reference systems are non-canonical, in the sense that some markers are not restricted to indicating subject coreferentiality or non-coreferentiality, but code other types of pivots (see, for instance, Sparing-Chávez 1998). This typologically salient feature of Pano syntax is absent in Takana languages, except for Ese' Ejja, whose system is non-canonical and thus reminiscent of the ones found in Pano. Gathering additional linguistic and ethnographic supporting evidence, Valenzuela & Vuillermet (2016) come to the conclusion that Ese' Ejja is innovative in this respect, and that this change might have been motivated by its contact with the Southwestern Pano languages Atsawaka/Yamiaka and Arazaire/Arasa, which used to be spoken in a relatively nearby area.

7. Conclusions and final remarks

The main objective of the present paper was to provide lexical and grammatical evidence in support of the hypothesis that the Pano and Takana languages are genetically connected. After establishing strict criteria for the identification of cognates, proto-Pano and proto-Takana were compared resorting to the 40-item basic vocabulary list put forward by the Automated Similarity Judgment Program (ASJP) (Holman et al. 2011). It was concluded that 18 of the 40 lexical items are likely cognate, which is certainly a very significant proportion. The similarities comprise 10 items designating parts of the body. Since body-part vocabulary is usually considered little prone to borrowing (Heine 1997), we embarked on the search for new cognates within this semantic field, which led to the identification of 8 additional shared items. Moreover, as shown in Zariquiey & Valenzuela (2022), not only are the body-part terms cognate but also the specific constructions in which they occur in languages of the two families are quite similar.

Turning to the grammar, almost 20 potential pP and pT cognates were uncovered including personal pronouns, demonstratives, a variety of nominal and verbal morphemes, and an interclausal marker. Next, two motion suffixes ('going down' and 'do coming') were discussed and pPT forms were reconstructed not only for those items but also for the independent verbs from which they developed (see also Guillaume 2017). Another shared feature is the existence of a pair of auxiliaries, intransitive and transitive; the latter reconstructs to pPT. The motion suffixes as well as the auxiliaries take part in fairly similar morphosyntactic constructions in Pano and Takana. For example, in both language clusters the said morphemes

may comply with a transitivity harmony restriction, so that they exhibit alternate forms in agreement with the transitivity value of the base/lexical verb (Valenzuela 2017). Finally, a pPT switch-reference marker indicating event sequentiality and participant coreferentiality was posited. Crucially, the form and function of the corresponding interclausal device in Takana coincides with a proposed earlier stage of the cognate marker in Pano (Valenzuela 2003).

There are further specific details that seem to render more reliability to the reconstructions postulated in this paper. For instance, the only numeral that reconstructs to pP is *raßita 'two', composed of the body-part prefix *ra- 'body' and the comitative *ßita. The pT form is simply *beta, which is compatible with the fact that Takana languages did not develop body-part prefixes (§5.2). The comitative reconstructs to pPT as **bita: pP *ßita, pT beta.

In addition to arguing in favor of the Pano-Takana Hypothesis, we expressed agreement with the proposition that specific languages from the two families most likely borrowed from each other at different times in their history. The coexistence of these different scenarios is not at all surprising, considering that Pano and Takana languages are/were spoken in more or less geographically contiguous areas (recall the discussion on the term for 'stone' in §5.2 and the reference to the innovative nature of the Ese' Ejja switch-reference system in §6.4).

In conclusion, we believe that the evidence provided in this study advances the Pano-Takana Hypothesis and, hence, constitutes a modest contribution to linguistic classification in this part of South America. It is our hope that future studies will continue to reveal lexical and grammatical affinities between Pano and Takana, and address new important questions regarding their different types of interactions, their relationships with languages from other lineages, and their possible inclusion in a larger stock.

Abbreviations

1, 2, 3	1st, 2nd, 3rd person
A	transitive subject
ABS	absolutive
AUX	auxiliary
BM	boundary marker
CAUS	causative
CONTR	contrastive
DES	desiderative
EMPH	emphatic
EXT.OBL	external obligation
FM	formative
GEN	genitive
HSY	hearsay
ID	identical subjects
IMP	imperative
IND.EV	indicative, direct evidential
INS	instrumental
INTR	intransitive
IPFV	imperfective
LOC	locative
MAL	malefactive
MID	middle
NAR	narrative register
NFP	(dummy) noun prefix
NON.PROX	non-proximate
PE	previous dependent event
PERF	perfect
PFV	perfective
pP	proto-Pano
pPT	proto-Pano-Takana
PRES	present
PREV	event in the marked clause is previous to event in the matrix clause
PST	past
PST2	pasado reciente
pT	proto-Takana
PTC	participle
REC.PST	recent past
REF	reflexive
REITR	reiterative
REM.PST	remote past
REP	reportative
RP	Reconstructed Pano
S	intransitive subject
S/A>A	coreferentiality between the S/A argument of the marked clause and the A argument of the matrix clause
S/A>S	coreferentiality between the S/A argument of the marked clause and the S argument of the matrix clause
SE	simultaneous dependent event
SG	singular
SEQ	sequential
SIM	event in the marked clause is simultaneous to event in the matrix clause
TEMP	temporal
TR	transitive

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Appendix A

Pano Lexical List

	gloss	*proto-Pano*	*Kakataibo*	*Shipibo-Konibo*	*Kapanawa*	*Marubo*	*Chakobo*	*Kaxarari*	*Yaminawa*	*Chaninawa*	*Sharanawa*
1	Tree	147. *hiwi	i	hiwi	hiwi	iwi	hiwi	hiwi	iɸi	-	iɸi
2	Tooth	414. *ʂi-	ʂita	ʂita	ʂita	ʃita	ʂita	ʂita	-	-	ʂita
3	Two	352. *ra-ßita	raβɨ́	raβɨ́	raβɨ́	ravivakɨ̃	raβɨ	tʃabita	raɸɨ	raɸɨ	raɸɨ
4	Liver	438. *tak^{w}a	tak^{w}a	taka	taka	taka	táka	taka	-	taka	taka
5	Leaf	325. piʔi	pɨi	pɨi	piʔi	pɨi	piʔi	piʔi	pii	pɨi	pii
6	Bone	398. *ʂao	ʂɔ:	ʂao	ʂao	ʃau	ʂao	ʂah^{w}u	ʂao	ʃao, ʂao	ʂao
7	Tongue	47. *hana	ana	hana	hana	ana	hana	hana	ana	ada	ana
8	Hand	*mɨ-	mɨkɨ̃	mɨkɨ̃	mɨkɨn	-	mɨkɨnɨ	mikili	mɨkɨ̃	mɨkɨ	mɨkɨ
9	Night	494. *yamɨtV	imɨ	yamɨ	yamɨ	yamɨ	-	yamɨta	yamɨa	yabɨ	yamɨ
10	Skin	89. *ßitsi	ßitʃi	ßitʃi	ßitʃi	vitʃi	ßitʃi	bitʃi	-	ɸitʃi	ɸitʃi
11	Fire	125. *tsiʔi	tʃii	tʃii	tʃiʔi	tʃi	tʃiʔi	tʃiʔi	tʃii	tʃii	tʃii
12	Knee	359. *rã-	rãβoʂo	rãβoʂo	raβoʂo	ravuʃɨ	-	t͡ʃ̃aburu	-	-	-

13	Blood	141. *himi	imi	himi	himi	im^{b}i	himi	himi	im	ibi	imi
14	Breast	429. *ʂo-	ʂoma	ʂoma	ʂoma	ʂoma	ʂoma	-	-	ʂoma	ʂoma
15	Sun	63. *ßari	βaɾi	βaɾi	βaɾi	vaɾi	βaɾi	βatʃi	-	ɸaɾi	ɸari
16	You	246. *mi	mi:	mia	mia	-	mia (object form)	-	-	-	-
17	Come	70. *ßi- ‘come, bring’	βi-	βi-	βi-	-	βi-	bi-	ɸi-	ɸi-	ɸi-
18	I	11. *ʔi	ʔi	ʔi	ʔi	-	i	-	-	-	-
Additional cognates referring to body parts											
	Flesh	258. *nami	nami	nami	nami	nami	nami	lami	nami, nãmi	nabi, dami	nami, namin
	Fat	412. *ʂini	ʂini	ʂini	ʂini	ʂini	ʂini	-	ʂinĩ	ʃidi, ʃidi, ʂidi	ʂini
	Fingernail	239. *mĩ-tsis[i]	Untsis, untsis	mĩntsis, mĩtsis	mĩntsis	mĩtsisi	mĩtsis, mĩtsisi	mĩtʃisi	mitsis, mitsisi	bitsis (otsis)	mitsisi, otsisi
		See footnote 56.									
	Foot, leg	*ta- ‘foot’	tai	tai	taʔi	tai	taʔi	taʔi	tai, taĩ	tai	tai, tain
	Lip, edge	155. *k^{w}i-	k^{w}iβi	kiβi	-	-	kiβitʃi	-	-	-	kuɸirisika
	Cheek	440. *tamo	tamo	tamo	tamo	ta^{m}bo	tamo	tamu	tamo, tamõ	-	tamo, tamon

	Mouth	158 *k^{w}iʂa[CV]	k^{w}iʂa	kiʂa	kiʂa	kiʃa	-	kiʂaka	kiʂã, kiʂamã	kiʃa, kiʂa	kiʂa, kiʂan
	Elbow	* βaʂ(u)-	banbuxu	põtõko	baʂpoʂko	-	baspoto	paxuxu	po-to-ʂko		

	gloss	*proto-Pano*	*Shanenawa*	*Katukina*	*Poyanawa*	*Amahuaca*	*Hantxa Kuin/Kaxinawa*	*Marinawa*	*Yawanawa*	*Korubo*	*Matis*	*Matsés/Mayoruna*
1	Tree	147. *hiwi	iwi	hiwi	iwi	hi:	hi	iwi	-	iwi	-	iwi
2	Tooth	414. *ʂi-	ʂita	ʂita	-	xɨta	ʂita	ʂita	ʂita	ʂita	ʂita	ʂita
3	Two	352. *ra-ßɨta	rafu	raβi	raβu	raβɨ	-	raɸɨ	raβɨ	łaβɨtpa	dabɨdpa	daɨd
4	Liver	438. *tak^{w}a	taka	taka	taka	taka	taka	taka	taka	tak^{w}a	takua	tak^{w}a
5	Leaf	325. piʔi	piɉ	pii	puy	piʔi	pii	pii	pii	-	pii	pɨ
6	Bone	398. *ʂao	ʂaw	ʃau	haw	xao	ʂau	ʂao	ʃau	-	-	*mi-ʂ* ‘wrist bone’, *tai-ʂ* ‘ankle bone’, and *ʂomoʂ* ‘needle made of bone’

		See footnote 46.										
7	Tongue	47. *hana	ana	ana	ãda	hana	hana	ana	anna	ana	ana	-
8	Hand	*mi-	-	-	-	mikĩ	mikĩ	miki	-	-	mikin	midante
9	Night	494. *yamɨtV	yamɨ	yamɨ	iãvu	yamɨ:	yamɨ	yamɨ	iamɨ	imɨt	imɨd	-
10	Skin	89. *ßitsi	fitʃi	-	-	-	bitʃi	ɸitʃi	ßɨtʃi	-	bitsi	bitsi
11	Fire	125. *tsiʔi	tʃi	tʃii	-	tʃiʔi	tʃi	tʃi	tʃi	-	-	-
12	Knee	359. *rã-	-	raβɨʂo	-	rawoxko	-	-	-	-	-	-
13	Blood	141. *himi	imi	himi	ibi	himi	himi	imi	imi	inta	imi	imi
14	Breast	429. *ʂo-	ʂuma	ʃuma	hũba	xoma	ʂuma	ʂoma	ʃuma	ʂuma	ʂuma	ʂuma
15	Sun	63. *ßari	faɾi	βari	βaɾi	bari	badi	ɸaɾi	βaɾi	βałi	badi	badiad
16	You	246. *mi	-	-	-	miya	mia	mia	-	mi	mi (minbi, mibi, min)	mi (minbi, mibi, min)
17	Come	70. *ßi- ‘come, bring’	-	-	-	βɨ-	bɨ-	ɸɨ-	βi-	βɨ-	βi-	bi-

18	I	11. *ʔɨ	-	-	-	ɨ	ɨ	ɨ	-	-	-	-
Additional cognates referring to body parts												
	Flesh	258. *nami	nami	nami	nãbi	nami	nami	nami	nami	-	nami	nami
	Fat	412. *ʂini	ʂini	ʃɨni	hãdi	xɨni	ʂini	ʂini	ʂini	ʃɨni	ʂini	-
	Fingernail	239. *mɨ̃-tsis[i]	mɨtʃɪʃɪ	mɨ̃tʃɪʃɪ	-	mɨntsis	mɨ̃tsis	mɨ̃tsisi	mɨtsisi	mɨtʃɪun	mɨntis	mɨntsis
	Foot, leg	*ta- ‘foot’	taɨ	taɨ	tay	taʔɨ	taɨ	taɨ	tai	taɨ	taɨ	taɨ
	Lip, edge	155. *kʷɨ-	-	-	-	-	kɨbitʃɪ	-	-		-	kwibi
	Cheek	440. *tamo	-	tamu	tãbu	tamo	tamu	tamo	-	-	-	tambu ‘beard’
	Mouth	158 *kʷɨʂa[CV]	kɨʂa	kɨʂa	kɨxaa	kɨʂa	kɪ̃ʂã	kɨʃa	kɨha	-	-	-
	Elbow	*βaʂ(u)-	-	-	-	vapoxko	baʂtunku	-	-	-	mɨntʂinβuɾuʂ	mɨntsimpis

Appendix B

Takana Lexical List

	gloss	*proto-Takana*	*Tacana*	*Reyesano/Maropa*	*Sapibokona*	*Araona*	*Mabenaro*	*Cavineña*	*Ese' Ejja*	*Warayo*	*Tiatinawa*	*Chama*	*Arasa*
1	Tree	8. *ak^{w}i	aki	- /ekená	-	acui	akwi	akwi	akwi	akwi	-	-	akui
2	Tooth	98. *t͡ʂe-	e-ce	e-ce/etre	echee	-	itsi	e-ce	e-se	e-sé	ese	e-sé	ese
3	Two	61. *beta	beta	mbeta/ beta	beta	beta	-	beta	beka	beabué	bikapiai	béka	-
4	Liver	403. *tak^{w}a	e-takwa	e-takwa/-	-	-	-	e-takwa	e-kakwa	e-takwe	-	-	etákua
5	To fan	337. *pei 'to fan'	-	-/-	-	-	-	pei-	e-pexi	pio-	-	-	-
6	Bone	96. *t͡ʂau	e-cau	e-cao/ etrá	-	-	-	e-cao	e-sá	e-sá	-	-	-
7	Tongue	12. *ana	y-ana	y-ana/ eana	eana	-	-	y-ana	eyana	y-ana	yana	-	eána

8	Hand	282. *me-	e-me	-/ emechuja	eme	eme	-	e-me	e-me	e-mé	-	-	emã̃
9	Night, tomorrow	290. *meta	mueta	-/maita	maetahe	-	-	meta	meka-waxe	-	-	-	eméte
10	Skin	72. *biti	e-biti	e-mbiti/embiti	-	-	-	e-biti	-	-	-	-	-
11	Fire	*ti	e-ti-ře	-ti-/-	-	etesi	-	e-tiki	-	-	-	-	-
12	Knee	128. *da	e-ma-da-cua	-/-	-	-	-	-	-	-	-	-	-
13	Blood	11. *ami	ami	ami/ami	-	-	-	ami	-	-	-	-	-
14	Breast	53. *ạtsu	-	-/-	-	-	-	-	-	-	-	-	-
15	Moon	37. *badi ‘moon’	badi	mbandzi/bansri	bari	badi	-	badi	baʔi	-	-	mái	-
16	You	292. *mi	mi-ke	mibe/mive	-	mitya	-	mi-kwana	mi-a	-	-	-	mikia
17	Come	*be- ‘bring’	-	-	-	-	-	-	-	-	-	-	-
18	I	151. *e	e-ma	e-me/éme	-	ema, yama	-	e-ra	ea, eyaya	-	-	-	-

Additional cognates referring to body parts													
	Flesh	362. *ɾami	yami	yami/eami	-	yami	-	e-rami	eyami	eyami	-	-	éami
	Fat	105. *t̪seri	e-cei	-	-	-	-	e-ceri	e-sei	-	-	-	ésey
	Fingernail	*metiji	e-me-haca	-/ emechuja 'fingers,' emetichi 'nails'	-	-	-	e-me-šoro 'nail'	e-me-kiše 'nail'	-	-	-	-
	Foot, leg	398. *ta- 'leg'	e-ta-buce 'shin bone'	-	-	-	itha	awa-taka 'tapir-foot (plant)'	-	-	-	-	-
	Lip, edge	243. *k^{w}e(i)-	e-ke-ke	kwesa 'beard'/euesa 'beard'	-	-	-	kwesa 'beard'	e-kwe-ša 'beard'	-	-	-	-
	Cheek	*tamu		ebu-tamu/-	-	-	-	–tamu	-shemo	-	-	-	-
	Mouth	232. *k^{w}at͡ʂa	e-kwaca	e-kwaca/ekuatra	ecuacha	-	ikwatsa	e-kwaca	e-kwasa	e-kwasa	-	-	-

	Elbow	29. – bạtsu	e-ba-cu	e-mba-co/-	-	-	-	-	e-basŏ	e-basŏ	wacu		ebasă

Appendix C

Pano Grammatical Morphemes

	gloss	*proto-Pano*	*Kakataibo*	*Shipibo-Konibo*	*Kapanawa*	*Marubo*	*Chakobo*	*Kaxarari*	*Yaminawa*	*Chaninawa*	*Sharanawa*
1	1ST SG 'I'	11. *ʔɨ	ʔɨ	ʔɨ	ʔɨ	-	ɨ	-	- ɨ̃	-	-
2	2ND SG 'you'	246. *mi	mii	mia	mia	-	mia (object form)	-	- mĩ	-	-
3	DEMONSTRATIVE	*ʔo- distal	un (A), ux (S), u (O)	oa	-	-	oa	-	oa	-	-
4	DEMONSTRATIVE	*ni- proximate	ɨnin (A), ɨnix (S), ɨni (O)	ni- ~ nato	-	-	noa, toa	-	na	-	-
5	GENITIVE	*-wɨ̃	=(a)n	-n	-	-	-	-	-na, -fɨna	-	-

6	IMPERATIVE	477. *-wɨ	-ɨ	-wɨ	-wɨ	-wɨ	-wɨ	-wɨ	-ɸɨ	-	-wɨ
7	‘GOING DOWN, DOWNWARD’	*-ßut	-	-	-	-	-	-	-	-	-
		See footnote 66.	-but	-	-	-	-	-	-	-	-
8	‘DO COMING’	*-ßɨ[…] (Guillaume 2017: 254)	-bɨtsin	-biiran	-	-	-bina	-	-ɸiran	-	-
9	DESIDERATIVE	*-katsa	-kas, -katsi	-kas	-katsiʔ-, -katsiʔki-	-katsi	-kas-	-katsa	kasma ‘not to want, kaspa ‘desiderative negative', katsa ‘to have’	-	-kas-mai ‘not to want’
10	NEGATIVE	493. *-[ya]ma (verbal)	-ma	-yama	yama	-ma, -ama	-yama	-ma, maʔa	maa ‘not’, -ma ‘negative’, -yama ‘negative prohibitive'	-	-ma ‘no’, -yama ‘imperative negative, prohibitive'

11	CAUSATIVE	202. *-m[a]	-mi-	-ma-	-ma-	-ma	-ma	-	-ma	-	-ma-
12	AUGMENTATIVE	*pa	-	-n ewá	-ahhuan		-wa		-nfã		
13	'DO (TR.), AUXILIARY (TR.)	1. *ʔak-	ʔa-	ʔa-	ʔa-	a	ʔa-	a-	ak-	a-	a-
14	TRANSITIVIZER	466. *-wa	-ɔ	-	-	-	-wa	-	-	-	-
15	DETRANSITIVIZER, REFLEXIVE	*-t	-t	-t	-	-	-	-	-	-	-
16	ERGATIVE	*-n	=(a)n	=n	-n	-	-	-	-	-	-
17	PREVIOUS EVENT, SAME-SUBJECT	*-ʂo-n	-ʂun	-ʂon	-	-	-ʂo	-ʂu	-	-	-
18	COMITATIVE, 'ALONG WITH'	*ßɨta	-bɨ ~ -bɨtan	-bɨ	-	-	-bɨta	-	fɨtã	-	-

	gloss	*proto-Pano*	*Shanenawa*	*Katukina*	*Poyanawa*	*Amahuaca*	*Hantxa Kuin/Kaxinawa*	*Marinawa*	*Yawanawa*	*Korubo*	*Matis*	*Matsés/Mayoruna*
1	1ST SG 'I'	11. *ʔɨ	-	-	-	ɨ	ɨ	ɨ	-	-	-	-

2	2ND SG ‘you’	246. *mi	-	-	-	miya	mia	mia	-	mi	mi (minbi, mibi, min)	mi (minbi, mibi, min)
3	DEMONSTRATIVE	*ʔo- distal	-	-	-	-	-	-	-	-	-	uid
4	DEMONSTRATIVE	*ni- proximate	-	-	-	-	-	-	-	-	-	n̈id
5	GENITIVE	*-wɨ̃	-	-	-	-	-	-	-	-	-	-
6	IMPERATIVE	477. *-wɨ	-wɨ	wɨ	-	-	-wɨ	-wɨ	-wɨ	-	-	-
7	‘GOING DOWN, DOWNWARD’	*-ßut	-	-	-	-	-	-	-	-	-	-bud
8	‘DO COMING’	*-ßi[…] (Guillaume 2017: 254)	-	-	-	-viran	-	-	-	-	-	-bitsen
9	DESIDERATIVE	*-katsa	-	-	-	-katsi	-kas-, katsi	-	-	-	-	-

10	NEGATIVE	493. *-[ya]ma (verbal)	-ma ‘negación general’, -yama ‘negación de imperativo'	yama ‘no tener, negativo’, ma ‘no’	ba ‘asertivo negativo’	-yama	-ma, -yama	-ma	-ma ‘negación’	-ma ‘negación pasado'	-ama ‘negación pasado'	-
11	CAUSATIVE	202. *-m[a]	-ma	-	-	-ma-	-ma-	-ma	-ma-	-me	-me	-me
12	AUGMENTATIVE	*pa	-	-	-	-	-	-	-	-	-	-pa
13	‘DO (TR.), AUXILIARY (TR.)	1. *ʔak-	-	-	-	ʔa-	a-	a-	-	ak-	ak-	ak-
14	TRANSITIVIZER	466. *-wa	-	-	-	-	wa-, -wa	-	-	-	-	-
15	DETRANSITIVIZER, REFLEXIVE	*-t	-	-	-	-	-	-	-	-	-	-
16	ERGATIVE	*-n	-	-	-	-	-	-	-	-	-	-n
17	PREVIOUS EVENT, SAME-SUBJECT	*-ʂo-n	-	-	-	=ʂon	=ʂun	-	-	-	=ʂun	=ʂun
18	COMITATIVE, ‘ALONG WITH’	*ßɨta	-	-	-	-wɨ, -wɨtã̃	-bɨ, -bɨtã̃	-fita	-	-	-	-bid (S), -bɨta

								, - fitã̃				(O), - bɨtan (A)

Appendix D

Takana Grammatical Morphemes

	gloss	*proto-Takana*	*Tacana*	*Reyesano/Maropa*	*Araona*	*Cavineña*	*Ese' Ejja*
1	1ST SG 'I'	151. *e	e-ma	e-me / éme	ema, yama	e-ra	ea, eyaya
2	2ND SG 'you'	292. *mi[1]	mi-ke	mibe / mive	mitya	mi-kwana	mi-a
3	DEMONSTRATIVE	442. *u- 'this' 'he'	u-ha	- /-	-	o-ho	o-haya
4	DEMONSTRATIVE	363. *ree- proximate	ye	- / -	-	reeke	hikio
5	GENITIVE	241. *-k^{w}e[2]	-ke	ki- 'possessive prefix' / -	-	-kwe	-kwe
6	IMPERATIVE	240. *-k^{w}e[3]	-ke	- / -	-	-kwe	-

[1] Girard additionally lists -*mikia* for Arasa.
[2] Girard additionally lists - *kwe* for Warayo.
[3] Girard additionally lists -*he* for Warisa.

7	'GOING DOWN, DOWNWARD'	78. *-bu[4]	e-bute-hi	- / animabotia	-	e-bote	-
		*-bute See footnote 67.	-ute	-bute / -	-bote	-bute/-butya	'oke/-'okya
8	'DO COMING'	*-be (Guillaume 2017: 233)	-be	-bebe / -	-	-be	-jebe
		*-katsa	-tsa	- / -	-hae	-kara	-sa
10	NEGATIVE	9. *-(a)ma (verbal and nominal)	-(a)ma	- / -		-(a)ma	-(a)ma
11	CAUSATIVE	289. *-me[re]	-me	- / -	-	-mere	-
		See footnote 73.	-	-	-me	-	-mee
12	AUGMENTATIVE	330. *-pa	-pa	-	-	-pa	-
13	'DO (TR.), AUXILIARY (TR.)	1. *a-[5]	a-	-	-	a-	a-ka-
14	TRANSITIVIZER	2. *-a[6]	-a(-)	-a(-) / -	-	-a(-)	-a(-)
15	DETRANSITIVIZER, REFLEXIVE	422. *-ti	-ti	- / -	-	-ti	-ki

[4] Girard additionally lists *anibuteni* for Warisa.
[5] Girard additionally lists *age* for Warisa.
[6] Girard additionally lists *-a*(-) for the Warayo.

16	ERGATIVE	361. *-ra[7]	-a	- / -	-	-ra	-(y)a
17	PREVIOUS EVENT, SAME-SUBJECT	*-ṯsu	-su	-	-tso	-atsu ~ -tsu	-
18	COMITATIVE, 'ALONG WITH' TWO	61. *beta[8]	beta	mbeta / beta	beta	beta	beka

[7] Girard additionally lists *-a* for Warayo.
[8] Girard additionally lists *beta, beabué* and *béka* for Sapibokona, Warayo and Chama respectively.

CRediT – Taxonomia de roles de colaboração acadêmica

AGRADECIMIENTOS

Pilar Valenzuela agradece al Dr. Willem F. H. Adelaar, quien la acogió como Investigadora Invitada en agosto-setiembre 2015, bajo los auspicios del Proyecto "The Linguistic Past of Meso-America and the Andes", Universidad de Leiden.

DECLARACIÓN DE CONFLICTO DE INTERÉS

Los autores declaran no tener intereses comerciales o asociativos que interfieran con la publicación de este texto, sometiéndose a las normas de la Revista *LIAMES-Línguas Indígenas Americanas*

CONTRIBUCIÓN DE LOS AUTORES

El trabajo se realizó en diferentes momentos y espacios en plena colaboración entre los dos coautores, participando ambos en la producción y recolección de datos, análisis, redacción del artículo, revisión bibliográfica, producción final y revisión del artículo

ÉTICA EN LA INVESTIGACIÓN CON SERES HUMANOS

Los datos se obtuvieron de obras y datos ya publicados, de acceso al público general.

FINANCIAMIENTO DE LA INVESTIGACIÓN

Pilar Valenzuela fue financiada inicialmente por el proyecto "The Linguistic Past of Meso-America and the Andes", dirigido por el Dr. Willem F. H. Adelaar, Universidad de Leiden, Países Bajos. Durante la mayor parte de la investigación, Valenzuela fue financiada por la Chapman University.
Roberto Zariquiey fue financiado por la Pontificia Universidad Católica del Perú.

Recebido: 17/6/2022
Versão revista 02/01/2023
Aceito: 10/1/2023
Publicado: 16/2/2023